1.0 INTRODUCTION

1.1 Reason for Development of Fire Management Plan

National Park Service (NPS) policy (*Director's Order #18: Wildland Fire Management*, website http://www.fire.nps.gov/fire/policy/do18/do18.htm) requires that every park unit with burnable vegetation develop a Fire Management Plan (FMP) approved by the park superintendent. The FMP serves as a detailed and comprehensive program of action to implement fire management policy principles and goals, consistent with the unit's resource management objectives. This plan outlines the fire management program at Fort Frederica National Monument (hereinafter referred to as the "park," the "monument," or by NPS alpha code "FOFR"). The FOFR fire management program, guided by federal policy and the park's resource management objectives, will serve to protect life, property, and natural and cultural resources.

1.2 Collaborative Processes

In addition to administering FOFR, the National Park Service collaborates with the U.S. Fish and Wildlife Service; the State Historic Preservation Office; the Georgia Department of Natural Resources, Coastal Resources Division; the Fort Frederica Association; the Brunswick-Glynn County Convention and Visitors Bureau; the Saint Simons Land Trust; the Georgia School System; community and business leaders; and park neighbors regarding how to best protect the integrity of the park.

Collaborative opportunities pertaining to fire management at FOFR include agreements or coordination with the Glynn County Fire Department, the Georgia Forestry Commission, Okefenokee National Wildlife Refuge, and local law enforcement.

1.3 Implementation of Fire Management Policy

The organizational structure of this FMP follows the outline furnished in chapter 4 of *Wildland Fire Management Reference Manual-18* (version 3.0, 11/05/02), hereinafter referred to as *RM-18* (website http://www.fire.nps.gov/fire/policy/rm18/index.htm). This FMP will guide the park in implementing federal fire management policy and resource and fire management goals as defined in the *2001 Federal Fire Policy*; *Managing Impacts of Wildfires on Communities and the Environment, and Protecting People and Sustaining Resources in Fire-Adapted Ecosystems—A Cohesive Strategy*; and *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan*.

1.3.1 2001 Federal Fire Policy

The 1994 fire season with its 34 fatalities triggered a series of reports under the rubric FIRE 21, including the *1995 Federal Wildland Fire Management Policy and Program Review*. This review, the first comprehensive federal fire policy for the Departments of Agriculture and the Interior, provided direction for fire management programs and

activities, including such areas as safety, protection priorities, preparedness, suppression, wildland fire use, prevention, and wildland-urban interface roles and responsibilities. Following the escape of the Cerro Grande Prescribed Fire in May 2000, the *1995 Federal Fire Policy* was evaluated and revised in the *2001 Review and Update of the 1995 Federal Wildland Fire Management Policy (2001 Federal Fire Policy).* The *2001 Federal Fire Policy* finds no fundamental flaws in the 1995 document. It builds on the *1995 Federal Fire Policy*, and addresses issues not fully covered in 1995, including rehabilitation and restoration of burned lands, the importance of sound science driving fire management activities, and the need for the full range of fire management activities to achieve ecosystem sustainability.

The *2001 Federal Fire Policy* states that "…successful implementation of 2001 Federal Fire Policy depends on the development and implementation of high-quality Fire Management Plans by all land managing agencies." The policy is founded on the following guiding principles:

1. Firefighter and public safety is the first priority in every fire management activity.

2. The role of wildland fire as an essential ecological process and natural change agent will be incorporated into the planning process.

3. Fire management plans, programs, and activities support general and resource management plans and their implementation.

4. Sound risk management is a foundation for all fire management activities.

5. Fire management programs and activities are economically viable, based upon values to be protected, costs, and general and resource management objectives.

6. Fire management plans and activities are based upon the best available science.

7. Fire management plans and activities incorporate public health and environmental quality considerations.

8. Federal, State, tribal, local, interagency, and international coordination and cooperation are essential.

9. Standardization of policies and procedures among Federal agencies is an ongoing objective.

1.3.2 Managing Impacts of Wildfires on Communities and the Environment, and Protecting People and Sustaining Resources in Fire Adapted Ecosystems—A Cohesive Strategy

The *Cohesive Strategy* was developed by the USDA National Forest Service, the US Department of the Interior, and the National Association of State Foresters, in response to the 2000 fire season, during which more then 6.8 million acres of public and private lands burned—more than twice the 10-year national average. The magnitude of these fires was attributed to severe drought, accompanied by a series of storms that produced thousands of lightning strikes followed by windy conditions; and the long-term effects of almost a century of aggressively suppressing all wildfires, resulting in an unnatural buildup of brush and small trees throughout forests and rangelands. The *Cohesive Strategy* provides an overall framework for implementing fire management and forest health programs. It is based upon the following operating principles:

- Firefighting Readiness: Increase firefighting capability and capacity for initial attack, extended attack, and large fire support that will reduce the number of small fires becoming large, to better protect natural resources, to reduce the threat to adjacent communities, and reduce the cost of large fire suppression.

- Prevention Through Education: Assist state and local partners to take actions to reduce fire risk to homes and private property through programs such as FIREWISE.

- Rehabilitation: Focus rehabilitation efforts on restoring watershed function, including the protection of basic soil, water resources, biological communities, and prevention of invasive species.

- Hazardous Fuel Reduction: Assign highest priority for hazardous fuels reduction to communities at risk, readily accessible municipal watersheds, threatened and endangered species habitat, and other important local features, where conditions favor uncharacteristically intense fires.

- Restoration: Restore healthy, diverse, and resilient ecological systems to minimize uncharacteristically intense fires on a priority watershed basis. Methods will include removal of excessive vegetation and dead fuels through thinning, prescribed fire, and other treatment methods.

- Collaborative Stewardship: Focus on achieving the desired future condition on the land in collaboration with communities, interest groups, and state and federal agencies. Streamline process, maximize effectiveness, use an ecologically conservative approach, and minimize controversy in accomplishing restoration projects.

- Monitoring: Monitor to evaluate the effectiveness of various treatments to reduce unnaturally intense fires while restoring forest ecosystem health and watershed function.

- Jobs: Encourage new stewardship industries and collaborate with local people, volunteers, Youth Conservation Corps members, service organizations, and Forest Service work crews, as appropriate.

- Applied Research and Technology Transfer: Focus research on the long-term effectiveness of different restoration and rehabilitation methods to determine those methods most effective in protecting and restoring watershed function and forest health. Seek new uses and markets for byproducts of restoration.

1.3.3 A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan

In August, 2001, the Secretaries of Agriculture and the Interior joined the Western Governor's Association, National Association of State Foresters, National Association of Counties, and the Intertribal Timber Council to endorse *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy*. This report marked the initial fulfillment of two key Congressional directives that:

- The Secretaries of the Interior and Agriculture and the Governors jointly develop a long-term national strategy to address the wildland fire and hazardous fuels situation and the needs for habitat restoration and rehabilitation; and

- The strategy should be developed with "close collaboration among citizens and governments at all levels."

The four goals of the *10-Year Comprehensive Strategy* are:

1. Improve fire prevention and suppression
2. Reduce hazardous fuels
3. Restore Fire-Adapted Ecosystems
4. Promote community assistance

Its three guiding principles are:

1. Priority setting that emphasizes the protection of communities and other high-priority watersheds at risk
2. Collaboration among governments and broadly representative stakeholders
3. Accountability through performance measures and monitoring for results

1.4 Environmental Compliance

In association with this plan, an environmental assessment that meets the requirements of the National Environmental Policy Act, including compliance with Section 106 of the National Historic Preservation Act and with Section 7 of the Endangered Species Act, is included as Appendix 13.4.

1.5 Authorities for Implementing Fire Management Plan

Authority for fire management at the park originates with the Organic Act of 1916. The Organic Act established the National Park Service "to promote and regulate the use of the Federal areas known as national parks,…which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

The 1978 "Redwood amendment" to the General Authorities Act of 1970 expands upon the provisions of the Organic Act, stating that, "…the protection, management, and administration of these [Park Service] areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established…"

As an NPS fire management program by design tiers to the respective park unit's general and resource management objectives, fire management is an effective way of implementing the above legislation.

2.0 RELATIONSHIP TO LAND MANAGEMENT PLANNING AND FIRE POLICY

2.1 Federal Fire Management Policy

The *2001 Federal Fire Policy*, discussed in section 1.3.1, is the product of a collaborative effort involving the U.S. Department of the Interior, the U.S. Department of Agriculture, the Department of Energy, the Department of Defense, the Department of Commerce, the U.S. Environmental Protection Agency, the Federal Emergency Management Agency, and the National Association of State Foresters. The report recognizes the role that fire plays as a critical natural process, as well as the detrimental effects of its absence in fire-adapted ecosystems. As per the report:

> Historically, fire has been a frequent and major ecological factor in North America. In the conterminous United States during the preindustrial period (1500-1800), an average of 145 million acres burned annually. Today only 14 million acres (federal and non-federal) are burned annually by wildland fire from all ignition sources….
>
> This decrease in wildland fire has been a destabilizing influence in many fire-adapted ecosystems such as ponderosa pine, lodgepole pine, pinyon/juniper woodlands, southern pinelands, whitebark pine, oak savanna, pitch pine, aspen, and tallgrass prairie. Fuels increased and understory vegetation became more dense. As a result, those wildland fires that did occur were larger and more severe than historical fires. Eliminating fire also affected individual plant species. For example, Hessl and Spackmen (1995) found that, of the 146 threatened, endangered, and rare plant species found in the conterminous U.S. for which there is conclusive information on fire effects, 135 species benefit from wildland fire or are found in fire-adapted ecosystems.

The report further states that:

> …today's conditions confront us with the likelihood of more rapid, extensive ecological changes beyond any we have experienced in the past. To address these changes and the challenges they present, we must first understand and accept the role of wildland fire, and adopt land management practices that integrate fire as an essential ecosystem process.
>
> The task before us—reintroducing fire—is both urgent and enormous. Conditions on millions of acres of wildlands increase the probability of large, intense fires beyond any scale yet witnessed. These severe fires will in turn increase the risk to humans, to property, and to the land upon which our social and economic well being is so intimately intertwined.

2.2 Establishment of Fort Frederica National Monument

The National Park System consists of more than 380 units representing our country's finest natural and cultural assets. Public Law 74-617 established Fort Frederica National Monument on Saint Simons Island, Georgia, on May 26, 1936, "for the benefit and inspiration of the people," authorizing "a museum for relics and records pertaining to Fort Frederica, and other articles of national and patriotic interest," providing for the erection of historical markers within the park, and directing the protection and development of the park in accordance with the Organic Act, as amended. Subsequent legislation authorized additional land acquisition to include the Bloody Marsh Battle site and marshlands in the immediate viewshed of the King's Magazine, the salient feature of the fort.

Fort Frederica preserves the remains of a fortified town established and laid out by Governor James Oglethorpe in 1736 to defend against invasion from the Spanish colonies in Florida. It represents a phase of our nation's early colonial history when England and Spain competed for control of the land between St. Augustine and Charleston. It was one of the earliest English settlements of any kind in the territory that was to become the State of Georgia. It was preceded only by Fort King George (1721), located a mile east of present day Darien, Georgia, and the cities of Savannah (1733) and Augusta (1735), also established and planned by Oglethorpe.

Fort Frederica was a prosperous community of substantial homes, whose residents were the tradesmen and farmers who supplied the garrison stationed there. In 1739, Britain and Spain entered a state of war that eventually involved Fort Frederica. Oglethorpe's unsuccessful attempt to take Spanish St. Augustine in 1740 was answered in 1742 when the Spanish Governor of Florida attempted to capture and destroy Fort Frederica. Oglethorpe's troops routed the invaders in two separate skirmishes at Gully Hole Creek and Bloody Marsh. A treaty finally established peace in 1748, and the British Crown withdrew Frederica's military garrison in 1749. Following the withdrawal of the garrison, the town of Fort Frederica fell into decline, and in 1758 a fire destroyed most of the existing structures in the town.

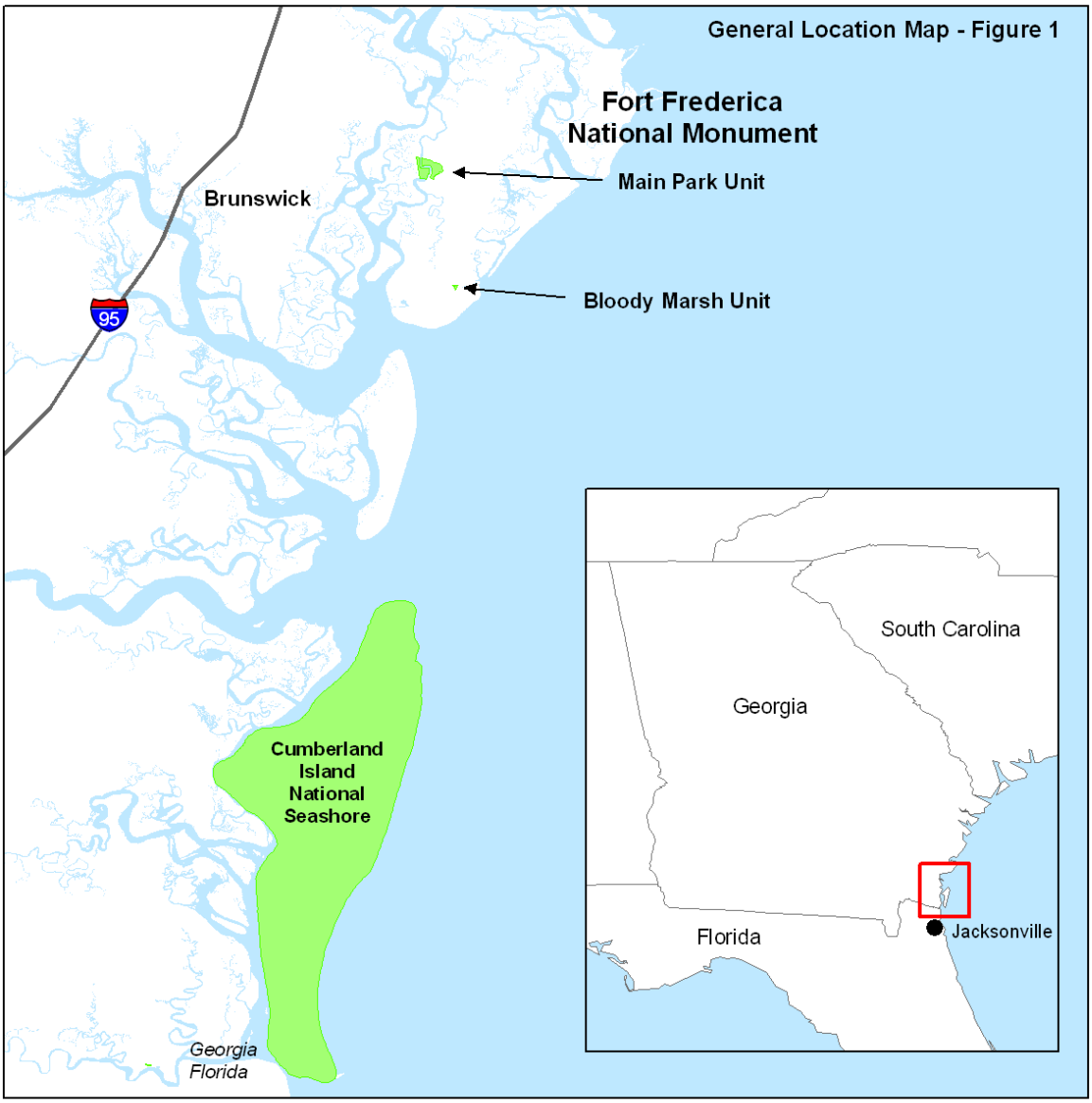
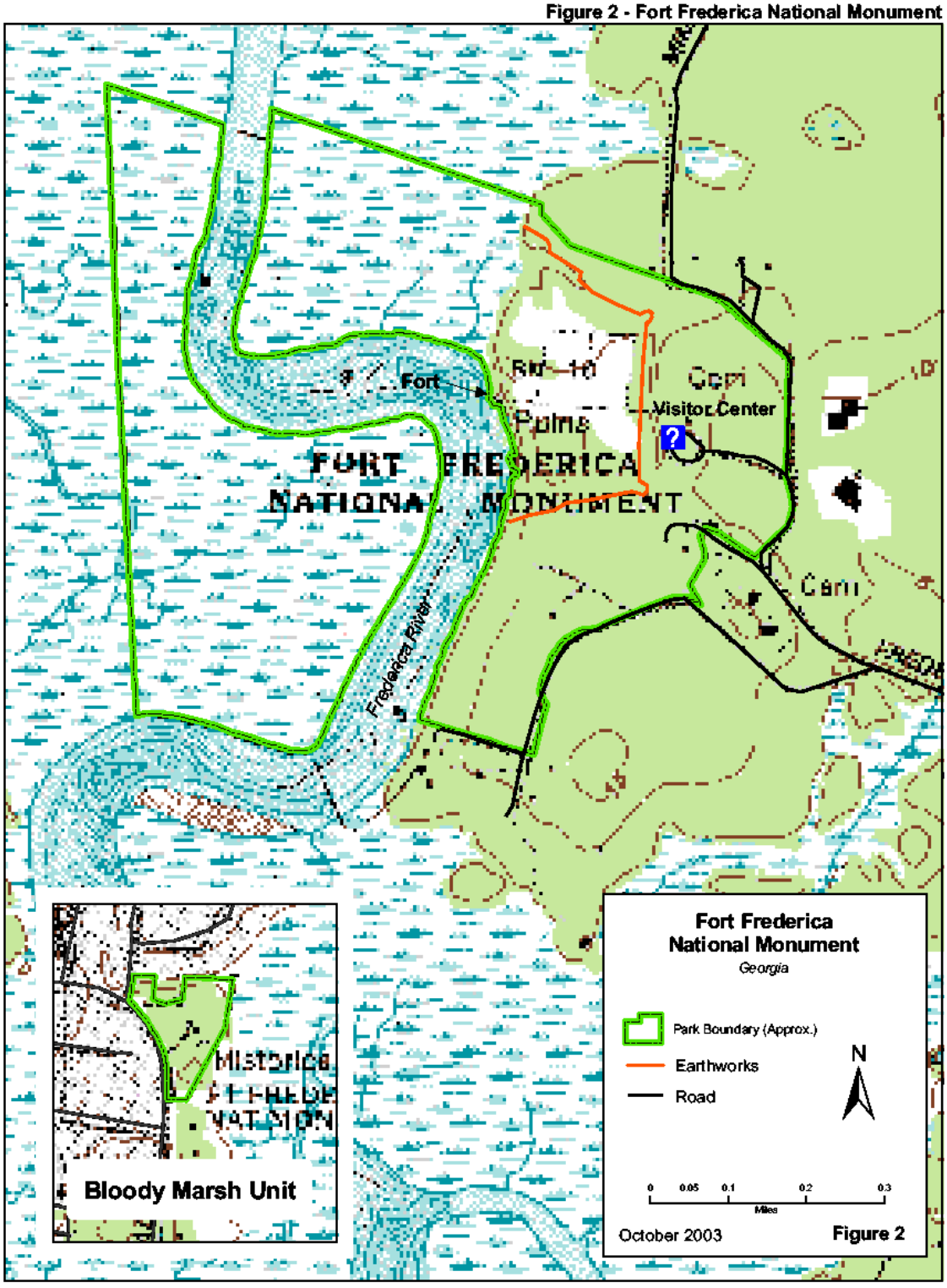

General Location Map - Figure 1
Fort Frederica
National Monument
Main Park Unit
Bloody Marsh Unit
Brunswick
95
Cumberland
Island
National
Seashore
Georgia
Florida
South Carolina
Georgia
Florida
Jacksonville

Figure 2 - Fort Frederica National Monument



2.3 General Management Plan Objectives

A General Management Plan and Environmental Impact Statement (GMP/EIS 2002) was developed in order to facilitate the achievement of FOFR's mission and its associated mission goals. The park's mission statement, which follows, describes the reason the park exists and the contribution it makes to understanding an important part of our nation's history.

> The mission of the National Monument is more than preserving the physical remnants of Frederica. It is also important to preserve its unique sense of antiquity and to use this time capsule as a tool to educate present and future generations about the nation's colonial past.

Four associated mission goals, which follow, broadly identify the desired conditions in the areas of resource management, site interpretation, facilities and park operations, and partnership development, that park management will seek to attain.

- All cultural resources and their relationships with the land are protected and preserved.

- Visitors safely enjoy and are satisfied with the availability, accessibility, diversity, and quality of park facilities, services, and appropriate recreational opportunities.

- Fort Frederica National Monument uses current management practices, systems, and technologies to accomplish its mission.

- Fort Frederica National Monument increases its managerial capabilities through volunteerism, partnerships and grants.

The GMP/EIS divides the park into five management zones—historic preservation, visitor service, park support services, natural resource-based passive recreation, and natural resource protection—with specific desired resource conditions and kinds and levels of management for each:

- Historic Preservation Zone

  - Desired resource conditions: Structural remains, cultural landscapes, and archeological resources would be protected as much as possible from further deterioration by natural processes or human activity. The landscape would be managed to promote cultural resource protection and interpretive objectives.

  - Kinds and levels of management: A moderate to intensive level of management would be required to prevent further deterioration of cultural resources. Management activities would include mowing of the areas around the existing exposed foundations as well as the earthworks, routine and appropriate treatment of tabby walls and historic brickwork, other vegetative control activities such as pruning and edging, and monitoring of the historic structures. Wayside exhibits

for orientation and education would be common in this zone. Placement of new signs and exhibits, maintenance, repair, and replacement of existing exhibits, and other interpretive activities would occur in this zone to achieve interpretive objectives. Some active archeology may occur here.

- Visitor Service Zone

  - Desired resource conditions: This zone would consist of necessary visitor facilities placed as unobtrusively as possible in an appropriate setting. Minimizing the impacts of these facilities on FOFR's cultural resources would be a high priority.

  - Kinds and levels of management: Management activities would include regular maintenance of both the structural and landscape elements in the zone. It would also include periodic maintenance and rotation of exhibits and artifacts as well as formal, informal, and ad hoc interpretation. Ongoing management activities to ensure visitor safety and comfort would also take place.

- Park Support Services Zone:

  - Desired resource conditions: This zone would consist of necessary park support facilities in an appropriate setting. Minimizing the impacts of these facilities on FOFR's cultural resources would be a high priority. A moderate level of native, non-invasive landscape plantings such as grass, shrubs, small trees, flowers, and ground covers could be introduced and maintained to improve the visual appeal of structures.

  - Kinds and levels of management: Moderate to intensive management in this zone would be directed toward maintenance of its buildings and grounds as well as staging and preparation for maintenance and resource protection activities in other zones.

- Natural Resource-Based Passive Recreation Zone:

  - Desired resource conditions: This zone would consist of vegetated communities exhibiting natural succession. The desired resource condition would be predominately natural, and management activities designed to encourage and support that condition would govern in this zone.

  - Kinds and levels of management: The goals of this zone are primarily to provide visual screening of the historical and archeological areas from sights and sounds originating outside the park boundary and from park maintenance and administrative areas, and to provide natural resource-based recreational opportunities. A low to medium level of management activity would be necessary to maintain this function. Such activity could include removal of exotic species, mowing, trimming, replanting native species, and pruning at the

boundaries of the zone. Management could restrict the kinds of recreational activities that occur in this area.

- Natural Resource Protection Zone:

  - Desired resource conditions: This zone would have the appearance of an undisturbed, nearly pristine natural environment. It would be carefully protected from degradation, exhibiting the free play of natural resources and natural ecosystem succession.

  - Kinds and levels of management: Management activity in this zone would be minimal, only as necessary to maintain natural appearance, protect areas from negative visitor impact and occasionally to remove exotic species to promote health of the natural ecology. Cooperation with other entities having jurisdiction over natural resources would be an important aspect of management in this zone.

Figures 3 and 4 indicate the boundaries of these management zones, as per the GMP/EIS preferred alternative (Alternative B - Life at Frederica).

Figure 3: Main Park Unit Management Zones

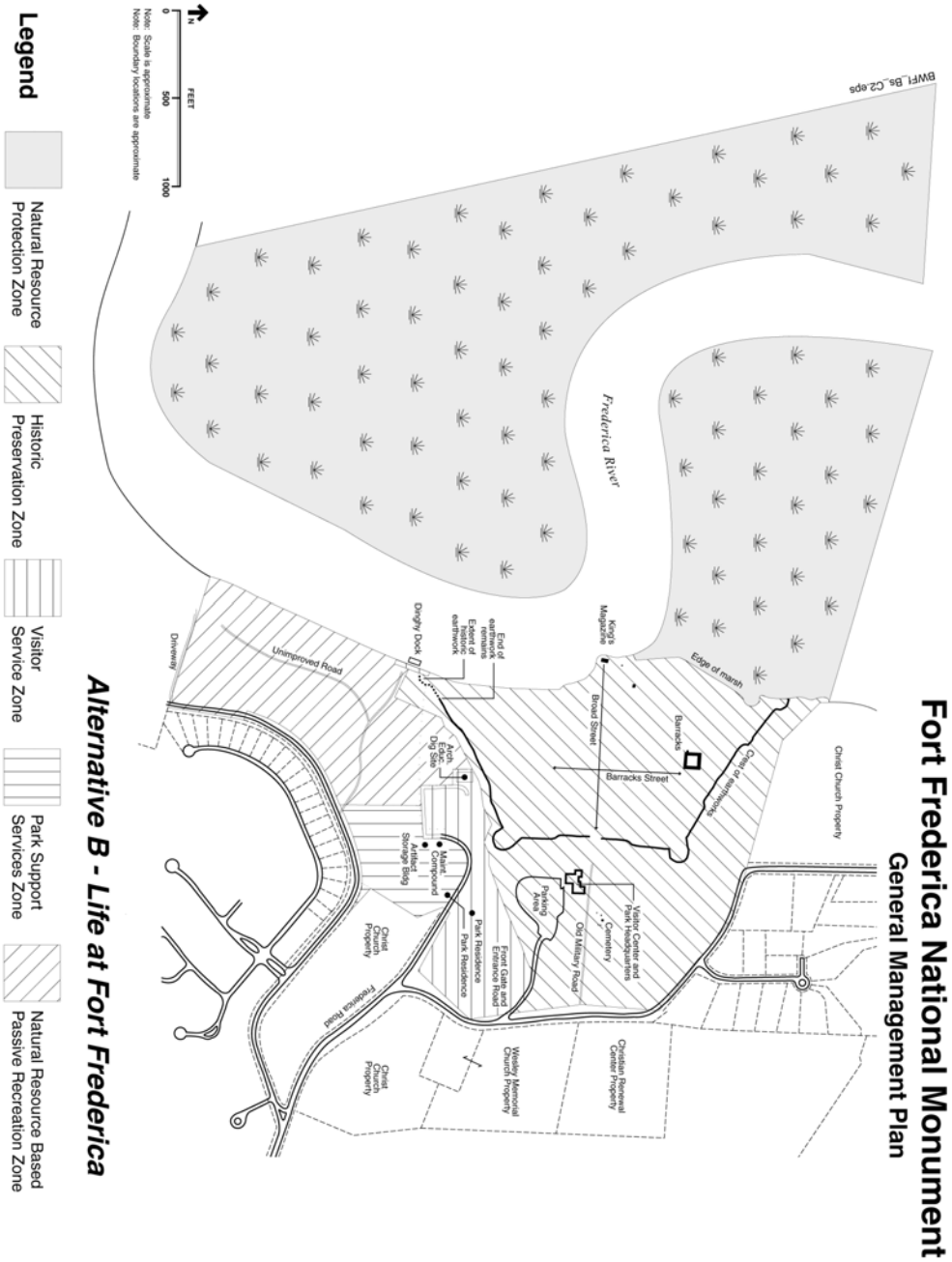
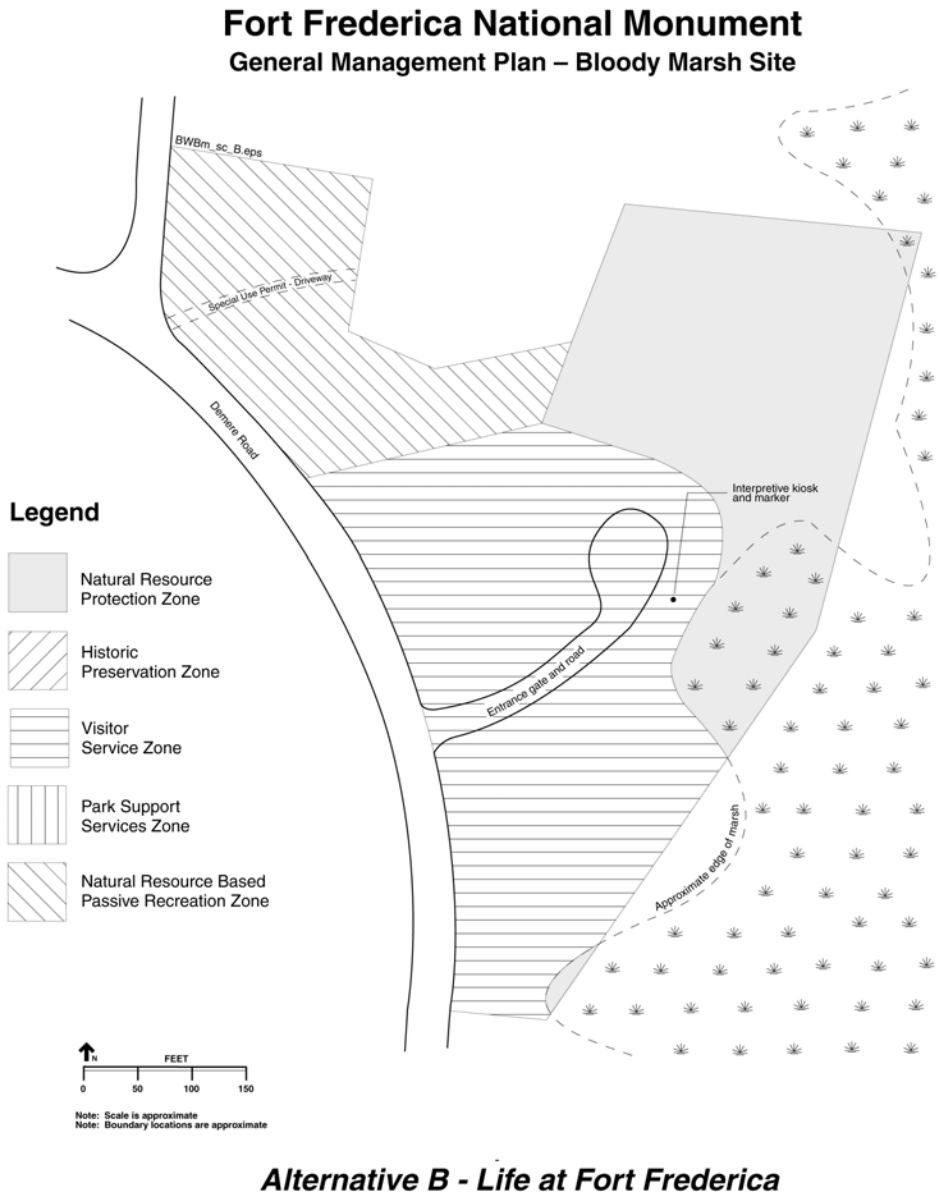


Figure 4: Bloody Marsh Unit Management Zones



2.4 Resource Management Plan Objectives

Objectives addressed in FOFR's 1997 Resource Management Plan (RMP) that are pertinent to fire management include:

- Preserve the fragile tabby, brick and earthwork remains at Fort Frederica and reduce, to the greatest degree possible, the effects of weathering, pollution, erosion, archeological looting and other adverse influences on the park's historic resources.

- Cooperate with government entities, community and civic associations and special interest groups to maintain the historical integrity of the park and to mitigate the potential effects of development adjacent to the Monument through creative and innovative methods.

- Preserve the scenic and natural features of the Monument, including the townsite, Bloody Marsh, and their significant landscapes.

Fire management is specifically addressed in the RMP as follows:

> There is a potential for serious wildfire in the thick forest surrounding and within the Monument due to the abundance of dead trees from previous infestations of pine beetles. The current [1986] fire management plan calls for the suppression of all park wildfires and makes no provision for prescribed burns. Past land management practices have disrupted the normal fire regime aiding the growth of a non-historic forest make-up.

2.5 How Fire Management Plan Supports General and Resource Management Plan Objectives

Principle #3 of the *2001 Federal Fire Policy* states that "fire management plans, programs, and activities [will] support general and resource management plans and their implementation." This fire management plan serves as a detailed and comprehensive program of action to implement federal fire management policy principles and goals, which in turn support the park's General and Resource Management plan objectives, as well as its enabling legislation. Specifically:

- Wildland fire suppression serves to protect human life, property, and natural and cultural resources from the adverse effects of unwanted fire.

- Prescribed fire serves to reduce hazard fuels accumulations. Reducing hazard fuels accumulations creates fuel conditions that support low-intensity fires, thereby reducing the threat of catastrophic wildland fire, and reducing the risk of negative impacts to natural and cultural resources, preserve infrastructure, and adjacent property in the event of a wildland fire. It also improves conditions for firefighter and public safety.

- Prescribed fire and its subsequent effects contribute to healthy ecosystem function as well as bio-diversity preservation. According to ecologist Nat Stephenson (quoted in an article from the May/June 1995 issue of *National Parks*),

  > Fires thin forests, reducing competition for surviving trees, improving their vigor. Fires result in a rich legacy of snags that are important for cavity nesting birds. They recycle nutrients bound up in dead litter. They can change soil properties, such as its ability to hold water. And they kill soil pathogens.

- Prescribed fire will assist in restoring and maintaining the historic landscape by opening up the understory within the wooded portion of the main park unit.

- Mechanically creating and maintaining hazard fuels breaks where necessary along sections of the park perimeter serves to prevent the spread of wildland fire to and from adjacent non-agency land.

3.0 WILDLAND FIRE MANAGEMENT STRATEGIES

3.1 General Management Considerations

The park's fire management goals, which follow, incorporate FOFR's overall management objectives as well as previously-discussed federal fire management policy principles and goals, including firefighter and public safety, collaboration, and accountability.

3.2 Wildland Fire Management Goals

Fire management goals at FOFR are:

- Suppress all wildland fire in a cost-effective manner, consistent with resource objectives, considering firefighter and public safety (always the highest priority), and values to be protected.

- Use prescribed fire and/or non-fire applications to:

  - Reduce hazard fuels accumulations, which in turn:

    - Reduces the threat of catastrophic wildland fire, and reduces the risk of negative impacts to park resources in the event of a wildland fire.

    - Improves conditions for firefighter and public safety, and reduces suppression costs in the event of a wildland fire.

  - Promote ecosystem sustainability.

  - Restore and maintain the historic landscape.

- Manage all wildland fire incidents in accordance with accepted interagency standards, using appropriate management strategies and tactics, and maximizing efficiency via interagency coordination and cooperation.

- Maintain existing cooperative agreements with state and local agencies in order to facilitate close working relationships and mutual cooperation regarding fire management activities.

- Develop and conduct a monitoring program with recommended standard monitoring levels commensurate with the scope of the fire management program, and use the information gained to continually evaluate and improve the fire management program.

- Integrate knowledge gained through natural resource research into future fire management decisions and actions.

- Maintain the highest standards of professional and technical expertise in planning and safely implementing an effective fire management program.

- Plan and conduct all fire management activities in accordance with all applicable laws, policies and regulations.

- Incorporate the minimum impact suppression tactics policy into all suppression activities, to the greatest extent feasible and appropriate.

3.3 Scope of Wildland Fire Management Elements to be Implemented

FOFR will implement a combination of wildland fire suppression, prescribed fire, and non-fire applications.

3.3.1 Wildland Fire Suppression

A wildland fire is defined as any nonstructural fire, other than prescribed fire, that occurs in the wildland. All wildland fires at FOFR, regardless of origin, will be suppressed.

3.3.2 Prescribed Fire

FOFR will use prescribed fire to reduce hazard fuels accumulations, to promote ecosystem sustainability, and to restore and maintain the historic landscape. Park planning documents will guide the use of prescribed fire.

3.3.3 Non-Fire Applications

FOFR will use non-fire applications (mechanical techniques) to create and maintain hazard fuels breaks where necessary along sections of the park perimeter, to create and/or maintain defensible space around park buildings, and to maintain open areas.

3.4 Park Description

FOFR has been divided into four fire management units (FMUs) to facilitate the achievement of fire management objectives. A description of the general physical and biotic characteristics of the park, below, is followed by discussion of the FMUs.

3.4.1 Physical and Biotic Characteristics

3.4.1.1 Real Property

Fort Frederica National Monument is located on the western side of Saint Simons Island, in Glynn County, Georgia. It is situated on a low bluff overlooking the Frederica River and the vast salt marshes beyond. Saint Simons Island is the second largest of Georgia's barrier islands (Cumberland Island is the largest), measuring approximately 11.5 miles long and ranging from one-half to two and one-half miles wide. It is the most populated of all the Georgia barrier islands, with about 14,000 permanent residents and approved developments for the north end of the island that will accommodate another 5,000 residents when complete in about 25 years.

The park is approximately 241 acres in size, containing the main park unit and the detached Bloody Marsh unit, located about six miles to the south of the main park unit, near the Saint Simons Airport. The eastern (upland) portion of the main park unit is bordered along its north, south, and east by residential and commercial property. Residential property is also located adjacent to the northern boundary of the Bloody Marsh unit.

A land exchange has been proposed that would change the current park boundaries somewhat. If/when this exchange occurs, the fire management plan will be amended to incorporate the new boundaries.

3.4.1.2 Soils

The primary soil series represented within the upland portion of the park are Cainhoy, Pelham, Pottsburg, and Rutledge; Bohicket and Capers underlie the marsh.

- Bohicket: Very poorly drained, very slowly permeable soils that formed in marine sediments in tidal marshes. These soils are flooded twice daily by seawater. Slopes are less than 2 percent.

- Cainhoy: Very deep, excessively drained, rapidly permeable soils that formed in sandy marine sediments. Slopes range from 0 to 10 percent.

- Capers: Very poorly drained, very slowly permeable soils in tidal marshes that formed in silty and clayey marine and stream terraces. Slopes range from 0 to 2 percent.

- Pelham: Very deep, poorly drained, moderately permeable soils that formed in unconsolidated Coastal Plain sediments. Located on nearly level broad flats, toe slopes, depressions and drainage-ways. Slopes range from 0 to 5 percent.

- Pottsburg: Very deep, poorly drained, moderately permeable soils that formed in sandy marine deposits. Located on flats, in areas of flatwoods, on rises, and on knolls. Slopes range from 0 to 2 percent.

- Rutledge: Very deep, very poorly drained, rapidly permeable soils that formed in marine or fluvial sediments. Located on flats, depressions, and floodplains. Slopes range from 0 to 2 percent.

3.4.1.3 Air Quality

FOFR is designated a class II air shed under the Clean Air Act. Under class II, modest increases in air pollution are allowed beyond baseline levels for particulate matter, sulfur dioxide, nitrogen and nitrogen dioxide, provided that the national ambient air quality standards, established by the Environmental Protection Agency (EPA), are not exceeded. Principal sources of air pollutants in the park vicinity are industrial emissions from nearby Brunswick, Georgia, and vehicle emissions.

3.4.1.4 Aquatic Resources/Water Quality

The Frederica River, which traverses the main park unit and forms the western boundary of the historic town site, is a tidal river. It separates Saint Simons Island from the saltwater marshes to the west, the MacKay River (also tidal), and ultimately the mainland at Brunswick, Georgia. At one time the Frederica River was a part of the Intracoastal Waterway and was dredged by the U.S. Army Corps of Engineers. This may have contributed to erosion of the riverbank at the park.

The park Resource Management Plan (RMP) addresses the need for a wetlands delineation and inventory study, stating that,

> ...no survey of the U.S. Army Corps of Engineers "jurisdictional" wetlands has been completed for the park. Land development considerations at Bloody Marsh, and perhaps at Frederica itself will be dependent on knowledge of the location of jurisdictional wetlands.

In regard to water quality at FOFR, the RMP states that,

> According to officials of the Georgia Department of Natural Resources (GDNR) Coastal Resources Division, water quality in the marshlands along the Frederica River is undocumented…The Georgia Environmental Protection Division does periodically monitor water quality at the mouth of the neighboring Altamaha and Brunswick Rivers but does not routinely in other creeks, like the Frederica River. Water quality deterioration is a concern from industrial pollutants as well as the impact of the intensive recreational use of the Frederica River by boaters and fishermen…The purity of local groundwater is also of some concern to the park. Several of the nearby industrial plants have buried or discharged,

legally and otherwise, toxic wastes in the Brunswick, Georgia community. This dumping has, in turn, contaminated ground water. The park has never had a full chemical and mineral analysis of its groundwater system even though it is a public water supply. The park does routinely monitor the park water supply for E coli and other bacterial contamination.

3.4.1.5 Vegetation

According to written reports of early colonial settlers such as John Wesley, the forested areas around the fort and particularly south of the town site were originally evergreen oak and mixed hardwood forests (Bratton 1983). Activities during the plantation period led to the drainage of interior wetlands for agriculture and the replacement of oak forest by cotton fields and successional pine forest. Pre-Civil War agriculture and post-War logging, as well as the development of a private yacht club south of the town site had further impacts on the native forests.

Currently, the area within the historic earthworks is vegetated by perennial grass with a scattering of mature live oaks. The surrounding woodland is dominated by 60- to 80-year old loblolly pine (*Pinus taeda*), with some laurel oak (*Quercus laurifolia*), water oak (*Quercus nigra*), live oak (*Quercus virginiana*), and saw palmetto (*Serona repens*) established in the younger stands of pine. In addition to these species, vegetation plots within the main park unit in 1983 identified varying amounts of southern bay (*Magnolia virginiana*), blackgum (*Nyssa sylvatica*), southern red cedar (*Juniperus silicola*), red mulberry (*Morus rubra*), hackberry (*Celtis laevigata*), sweetgum (*Liquidambar styraciflua*), pecan (*Carya illinoenensis*), pond pine (*Pinus serotina*), redbay (*Persea borbonia*), bayberry (*Myrica cerifera*), sassafras (*Sassafras albidium*), yaupon (*Ilex vomitoria*), and blueberry (*Vaccinium spp.*). In the last 15 years or so, the park has implemented a program of planting young live oaks in the northern section of the main park unit where previously only grass had grown.

Marsh grasses, such as smooth cordgrass or saltmeadow cordgrass, and floating-leaved aquatic plants, dominate the marsh at FOFR.

The University of Georgia is currently conducting a vascular plant inventory at the park. Appendix 13.3 includes a park floral species list.

3.4.1.6 Wildlife

The Coastal Plain of the southeastern United States, and particularly the barrier islands, saltwater marshes and estuaries, provide habitat for a great diversity of animal species, including the American alligator, the West Indian manatee, sea turtles, and large numbers of migratory birds. Other bird species inhabiting the island include the peregrine falcon, merlin, osprey, kestrel, bald eagle, heron, egret, ibis, and brown pelican. Terrestrial animals found on the island include deer, opossum, gray squirrel, raccoon, and rabbit, as well as various species of lizards and snakes.

The University of Georgia is currently conducting a herpetofaunal inventory at the park. Within the next three years, Auburn University is scheduled to begin a fish inventory, the

Georgia Department of Natural Resources is scheduled to begin an avifaunal inventory, the University of North Carolina at Wilmington is scheduled to begin a small mammal inventory, and the University of Florida is scheduled to begin a bat inventory.

Appendix 13.3 includes a park faunal species list.

3.4.1.7 Threatened and Endangered Species

Coordination with the U.S. Fish and Wildlife Service and the Georgia Department of Natural Resources revealed that the following federally- and/or state-listed threatened or endangered species could potentially occur within park boundaries:

- Bald eagle (*Haliaeetus leucocephalus*), federally-listed threatened, state-listed endangered
- Eastern indigo snake (*Dyrmarchon corais*), federally- and state-listed threatened
- Gopher tortoise (*Gopherus polyphemus*), state-listed threatened
- Peregrine falcon (*Falco peregrinus anatum*), state-listed endangered
- West Indian manatee (*Trichechus manatus*), federally- and state-listed endangered
- Wood stork (*Mycteria americana*), federally- and state-listed threatened

Of the above-listed species, the only one that has actually been documented within park boundaries is the West Indian manatee, observed on two occasions during the summer of 1990 in the Frederica River at the foot of the King's Magazine. No designated critical habitat exists at the park.

3.4.1.8 Cultural and Historic Resources

In 1966, when the National Historic Preservation Act was passed, appropriate resources located on property holdings of previously established National Parks with historic themes were administratively listed on the National Register of Historic Places (NRHP). During that year, Fort Frederica was added to the National Register (Listing #66000065). On December 22, 1978, a revised nomination was accepted by the National Register which established Fort Frederica National Monument as a historic district consisting of two parcels: Fort Frederica National Monument and Bloody Marsh.

Cultural resources at the park include 19 brick, tabby, and earthen remains of foundations and other structures that were part of the original settlement. All of these structures are individually listed as contributing resources on the NRHP. Only five of the structures are above ground level; the rest are archeologically exposed foundations. There are probably also additional physical remnants of the settlement, which are still buried in the areas around the foundations and in other areas of the site. Earthworks that formed part of the town's defenses are still in evidence, though greatly reduced in size and softened in shape by time and weather. The moat is also still visible in spite of having been partially filled over the past 250 years.

A burial ground, with six above-ground vaults, is located several yards from the rear of the park visitor center. The exact relationship of these vaults to the Fort Frederica settlement is not known. Between the burial ground and the visitor center/parking lot is the historic trace of a narrow military road that connected Frederica with Fort Saint Simons, six miles to the south. British troops marched down this path through the forest to battle invading Spanish troops in 1742.

According to the park's Resource Management Plan (RMP), "Overall, the town site and fort are in fair condition, owing to their exposure to the elements and visitor contact." Both the RMP and the park's 1999 Management Analysis Report discuss the need for preservation guidance in the form of a plan that details the appropriate techniques, tools, materials, and scheduling for preserving the park's cultural resources-ruins, foundations, earthworks, and monuments.

Thirty-one park structures are presently included on the List of Classified Structures, identified in Table 1.

Table 1: FOFR List of Classified Structures

LCS No.	Structure No.	Structure Name
312	HS-16	Guard House (Ruins)
313	HS-14	The Barracks (Ruins)
314	HS-09	Hawkins-Davison House (Ruins)
317	HS-12	King's Magazine (Ruins)
6022	HS-01	LeValley, John, Jr., House (Ruins)
6023	HS-02	Humble, John, House (Ruins)
6025	HS-04	Mackay, Captain James, House (Ruins)
6028	HS-07	Calwell, John, House (Ruins)
6029	HS-08	Perkins, Samuel/Carr, Captain Mark, House (Ruins)
6030	HS-10	South Storehouse (Ruins)
6031	HS-11	North Storehouse (Ruins)
6032	HS-13	Moore, Francis, House (Ruins)
6034	HS-17	Dunbar-Houston House (Ruins)
6035	HS-18	Town Moat
6037	HS-19	Earthworks
6503	HS-17B	Houston Storage Bins (Ruins)
90061	HS-04B	Mackay Well (Ruins)
90062	HS-10B	Town Well (Ruins)
90063	HS-14B	Barracks Well (Ruins)
90064	HS-15A	Burial Vault 1 (Ruins)
90065	HS-15B	Burial Vault 2 (Ruins)
90067	HS-15C	Burial Vault 3 (Ruins)
90068	HS-15D	Burial Vault 4 (Ruins)
90069	HS-15E	Burial Vault 5 (Ruins)
90071	HS-21	Wilson House (Ruins)
90072	HS-22	Abbott Monument
90073	HS-23	Military Road
90074	HS-24	Musgrove, Mary, House (Ruins)
90075	HS-25	Allen House (Ruins)
90076	HS-02B	Humble Well (Ruins)
90101	HS-26	Blacksmith's Forge (Ruins)

Since the 1940s, through at least 40 archeological investigations at FOFR, archeologists have identified many of the principal architectural features of the town and fort, including many of the town lots and individual homes of Frederica's residents. Archeologists have focused not only on the identification and interpretation of the architecture and material culture of the town, but have sought to explain the lifeways and adaptation of Frederica's residents to the New World. Other archeological investigations have been undertaken to mitigate impacts to archeological resources from various construction projects proposed for the park.

Many of the excavated sites have been left exposed as interpretive exhibits, with some stabilization accomplished to protect the features. Thousands of artifacts recovered through these excavations are housed in the park's collection and in storage at the NPS Southeast Archeological Center in Tallahassee, Florida. In addition, the Margaret Davis Cate archives collection, bequeathed to FOFR in 1961, is on long-term renewal loan to the Georgia Historical Society in Savannah. The Cate collection includes 10,000 documents, books, manuscripts, photographs, maps, tapes, and recordings containing a vast amount of information on the people and events of the Fort Frederica settlement, as well as the history of St. Simons Island and other islands of coastal Georgia.

Fort Frederica is also the site of one of the most innovative and successful examples of "Parks as Classrooms" in the National Park System. The Archeology/Education program provides for every fourth grader in the Glynn County public school system to learn about the history of Fort Frederica and the science of archeology through a curriculum of classroom instruction, archeological field investigations, and laboratory work. It also helps instill in the students a sense of the importance of protecting and preserving cultural resources.

The draft *Archeological Overview and Assessment of Fort Frederica National Monument, Glynn County, Georgia* (Hellmann and Prentice 2003) summarizes current knowledge regarding the archeological content, resources, and potential of the park, and provides referential data for future archeological research designs and investigations, as well as archeological interpretation and preservation at FOFR.

The report summarizes the following archeological sites and subsites located within the boundaries of the park. These sites (and site numbers) pertain to the Archeological Sites Management Information System (ASMIS) database that is maintained by the National Park Service to manage cultural resources within park units. The Georgia Archeological Site File maintains a separate number, 9GN177, which pertains to the main park unit.

- FOFR-1.00 Fort Frederica
    - FOFR-1.01 South Storehouse
    - FOFR-1.02 North Storehouse
    - FOFR-1.03 King's Magazine
    - FOFR-1.04 Fort Bastions and Walls
    - FOFR-1.05 Blacksmith Shop

- Town of Frederica

  - FOFR-1.06 Lots 2 and 3 South (Hawkins-Davison)
  - FOFR-1.07 Lot 4 South (Patrick Houstoun)
  - FOFR-1.08 Lot 5 South (John Welch)
  - FOFR-1.09 Lot 6 South (Allen)
  - FOFR-1.10 Lot 7 South (John LeValley, Sr.)
  - FOFR-1.11 Lot 8 South (Humble/Helzendorf)
  - FOFR-1.12 Lot 9 South (John LeValley, Jr.)
  - FOFR-1.13 Lot 10 South (Mary Musgrove)
  - FOFR-1.14 Lot 11 South (John Roberson/Flesh Market)
  - FOFR-1.15 Lot 2 North (Samuel Perkins/Mark Carr)
  - FOFR-1.16 Lot 3 North (Michael Germain)
  - FOFR-1.17 Lot 4 North (John Calwell)
  - FOFR-1.18 Lot 5 North (George Spencer/John Harding)
  - FOFR-1.19 Lot 6 North (Daniel Cannon)
  - FOFR-1.20 Lot 7 North (Michael Wilson)
  - FOFR-1.21 Lot 8 North (Will Abbot)
  - FOFR-1.22 Lot 9 North (Levy Bennet)
  - FOFR-1.23 Lot 10 North (James Shepard/Thomas Eyre)
  - FOFR-1.24 Lot 11 North (Thomas Walker)
  - FOFR-1.25 Lot 13 North (Thomas Hird)
  - FOFR-1.26 Lot 17 North (Thomas Proctor, Sr.)
  - FOFR-1.27 Lot 18 North (Embroisseus Tetzner)
  - FOFR-1.28 Lot 21 North (Francis Moore)
  - FOFR-1.29 Lot 35 North (Jacob Faulcon/Richard Harrison)
  - FOFR-1.30 Lot 36 North (Public Bakery)
  - FOFR-1.31 Lot 47 North (Will Moore)
  - FOFR-1.32 Lot 48 North (Thomas Mason)
  - FOFR-1.33 Lot 41 North (William Forrester)
  - FOFR-1.34 Town Palisades (Town Fortifications)
  - FOFR-1.35 Town Gate
  - FOFR-1.36 Town Bastion-NW
  - FOFR-1.37 Town Bastion-NE
  - FOFR-1.38 Town Bastion-SE
  - FOFR-1.39 Town Bastion-SW
  - FOFR-1.40 Barracks
  - FOFR-1.41 Guard House

- FOFR-2.00 Burial Ground

- FOFR-3.00 Bloody Marsh Battlefield

- FOFR-4.00 Deptford Site

In regard to recommendations for future archeological research, the report states,

> While most of the main features of the town and fort have been extensively investigated, certain areas of the park, both spatially and chronologically, remain underrepresented. Investigation of these resources is important not only to interpret them for the public but also

to place Fort Frederica and St. Simons Island in a wider historical and regional context. Further identification and study of resources in the park is also necessary for planning any future construction or ground disturbing projects which may impact the archeological resources of the park.

Little attention has been focused on the prehistoric and early historic inhabitants of the area comprised by the park. Historic research has made reference to the site of Fort Frederica as being an "old Indian field" and various types of prehistoric and early historic Indian materials have been recovered during archeological investigation. A systematic study of these resources would not only help to further interpret the park's history to the public but also contribute to a greater understanding of the region's prehistory and early historic period including the identification of any possible remains or evidence of the earlier Spanish occupation of St. Simons Island.

Even though most of Frederica's architectural features have been adequately investigated, some areas remain that could be more thoroughly studied. Two such areas include the northwest area of the park which reportedly was the location of at least two powder magazines, and the location of the southwestern town half-bastion. The northwest area is particularly suitable for a remote sensing survey (ground penetrating radar would be a logical first approach) which could identify architectural features associated with the powder magazines and any other possible structures. The town's southwest half-bastion was formerly located on the grounds of the Frederica Yacht Club. This area, which has since been added to the park, should be surveyed to identify any cultural resources in addition to the previously identified bastion. In addition to a survey of the recently acquired property, the area of the bastion should be excavated to identify any remaining features associated with it.

Another possible area for future investigation would be a study of Frederica's later residents. A small number of residents continued to live in the former town of Frederica on into the 19th century, but little is known archeologically about the families that remained. A greater research focus on these components of the archeological record at Fort Frederica National Monument will add to the historical knowledge of the site between the time attempts to maintain the fort were abandoned in 1767 until Mrs. Belle Steven Taylor donated the fort land to the Georgia Society of the Colonial Dames of America in 1903.

The park has an approved Land Protection Plan, which will be followed and updated as needed to maintain consistency with the park's cultural landscape preservation objectives. Park management attends and assertively participates in local and regional zoning and planning meetings and organizations, and keeps alert for other activities affecting the scenic approach to the park and the cultural landscape, including the marshlands.

3.4.2 Management Considerations

- Ensure that firefighter and public safety remains the primary consideration in planning and conducting all fire management activities.

- Ensure that archeological/cultural/historic resources are considered in planning and conducting all fire management activities.

- Ensure that smoke management is considered in planning and conducting all fire management activities.

- Ensure that all applicable laws, policies and regulations are considered in planning and conducting all fire management activities.

- Ensure that socio-political economic impacts, including wildland urban interface, are considered in planning and conducting all fire management activities.

- Ensure that appropriate fire prevention and suppression actions are addressed in the right-of-way plans of development/vegetation management/contingency documents associated with and required for electrical transmission lines located on agency land.

- Ensure that fire management activities are coordinated as appropriate with all affected parties. This includes any federally recognized Indian tribes that have historical, cultural, economic or other interests in the proposed action or its effects (required, for example, by 36 CFR 800, 40 CFR 1508, and 43 CFR 10).

3.4.3 Past Role of Fire

Ecological and meteorological evidence indicates that lightning-caused fires were a major environmental force shaping the vegetation of North America for millions of years prior to human habitation (Van Lear and Waldrop 1989). Fire-adapted ecosystems developed, as did individual plant species dependent upon or adapted to wildland fire. According to fire ecologist Dr. Cecil Frost (1998), "…fire once played a role in shaping all but the wettest, the most arid, or the most fire-sheltered plant communities of the United States."

The report entitled *The Vegetation History of Fort Frederica, Saint Simons Island, Georgia* (Bratton 1983) provides an overview of human influence, including fire, on the vegetation and landscape of Fort Frederica. According to the report, historic records indicate that anthropogenic burning was an important disturbance factor on the island, from the aboriginal period to the Civil War. Human influence, in its varied forms, has concurrently altered the fire regime, discussed in section 3.4.5.4. As per the report,

> The historic records indicate that there were ten different periods of human interaction with the vegetation and the landscape in the Fort Frederica area. Anthropogenic disturbances and impacts varied from almost none, during times of abandonment, to the extensive logging and agriculture of the plantation era. The periods and their documented effects are as follows [abridged]:
>
> 1) Aboriginal agriculture: Indians inhabiting St. Simons and other Georgia barrier islands harvested fish and shellfish, hunted, and farmed small fields. If their behavior was similar to that observed in early colonial times, the Indians burned the marshes and forest understories.
>
> 2) Spanish missions: The Spanish established missions in the Georgia barrier islands shortly after the founding of Saint Augustine in 1565. There was an active mission on the south end of St. Simons, but its location is presently unknown. The Spanish introduced some European plant species and domestic animals but did not initiate agricultural or

logging operations, other than the necessary fields and gardens in the immediate area of the missions. While missionaries apparently did little to change Indian agricultural techniques, it is probable that the wars, diseases and other cultural disruptions associated with Spanish occupation influenced the amount and location of Indian agricultural activity prior to the arrival of the English. The Spanish abandoned their effort in 1686 (Vanstory 1970, Cate 1979).

English records mention few landscape changes attributable to the Spanish. Other than the noting of orange and peach trees, and the use of the term "Spanish" for some old fields, there seemed to be little lingering Spanish influence on the island landscape. This can probably be attributed to the fact that there were relatively few Spanish, and it was not their intent to establish towns and farms.

3) Spanish abandonment: After the Spanish left St. Simons, there was a half century when the island was again managed by the Indians. Presumably the patterns of agriculture changed little.

4) English settlement: The first English landing party arrived at the site of Fort Frederica in 1736. Colonial records contain references to Indian agriculture and fire use. Francis Moore (Candler 1904-1916) wrote in early 1736, "There were great Fires on the Main over against Fort Frederica…made by the Creek English Indians…" and later that year wrote, "We daily saw several Smoaks and Fires all along the Shore, which were made by the friendly Indians by Mr. Oglethorpe's Order." The colonists apparently also burned freely. Moore noted that when they first landed on St. Simons they fired the spot where the sloop first came in and thus, "destroyed all Vermin, and made the Country round clear, as not to be only pleasant to the Eye, but convenient for walking." Moore also stated that when a Mr. Hemsdorf landed on the main land he "made great Fires in different Places" and did the same on St. George's Island on the north end of Talbot Island where he set "all the Wood on Fire." Van Reck, writing in 1734 (Candler 1904-1916) noted that on the main land "the Country is so good, that one may ride full gallop 20 or 30 Miles on end." This infers extensive burning of the forest understories by the Indians, since fire was probably the only disturbance that could have achieved this open effect, and the English did not become established on the main land until 1733.

The English colonists found scattered old fields present when they arrived, and the site of Frederica was, according to Francis Moore, "in the middle of an Indian Field, where our People found thirty or forty acres of Land cleared by them." He reported that, "In the Fort also are some fine large Oakes preserved for shade…" (this indicates the Indians did not completely clear their fields).

Moore noted that "The Woods on the Island are chiefly Live-Oak, Water-Oak, Lawrel, Bay, Cedar, Gum and Sassafras and some Pines." This is in sharp contrast to both plantation period descriptions and the current situation, with pine dominating the Fort Frederica vicinity.

The major colonial activities were construction of the fort and clearing of a commons, and cultivation. Logging was limited primarily to the immediate needs of the colony. Wrote Moore in 1739, "To the South is a little Wood of red Bay-trees, Live Oaks, and other useful Timber, which is reserved for Public Service….To the North are Woods, where the People have leave to cut for Fire and Building, for all that side is intended to be cleared." According to historic records, timber not needed for the colony, of which there was "a great

quantity excellent for building ships," could not be sold for lack of a market, and was therefore burned as the fields were cleared.

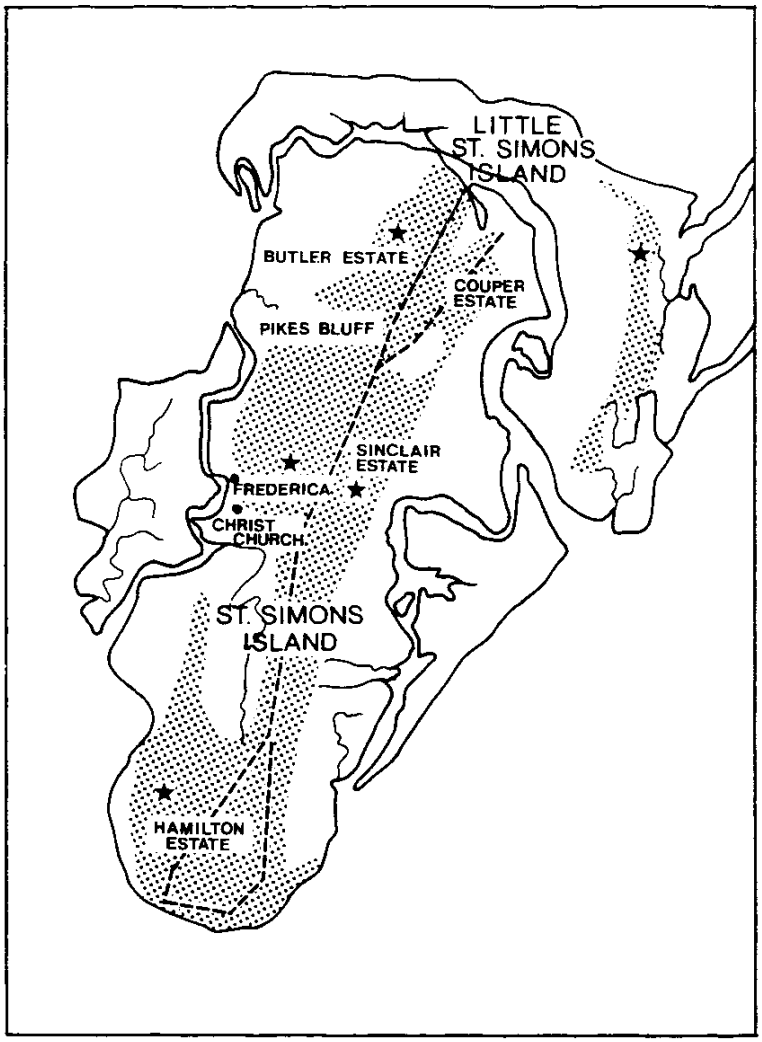
The settlers grew a wide variety of crops, including both native species, such as corn and tobacco, and introductions from Europe and the West Indies. Since Frederica was the site of a plantation prior to the Civil War, most of the colonial plantings were probably replaced during the 19th century.

5) Abandonment of the town of Frederica: After the end of the 1739-1748 war with Spain, Frederica no longer needed a full garrison and Oglethorpe's regiment was disbanded. Most of the non-military families also left the town, and by1753, the town was largely abandoned. In 1758, a fire destroyed most of the buildings.

6) Plantation period: Beginning in the 1790s, agricultural activities on St. Simons started to expand, as did the timber industry. "Oaks of all kinds," particularly live oak for ship building, as well as cedars, cypress, hickory, ash, walnut, cherry, mulberry, poplar, chestnut, chinquapin, red bay and pines, were processed at lumber mills in St. Mary's, on the main land (Thayer 1957). The decline in indigo prices in 1790 encouraged cotton cultivation, theretofore planted only in minimal quantities. Since hammock lands of live oak "intermixed with walnut, hickory, cherry, red bay, cedar, white and red oak and some pine" were preferred for cotton (Thayer 1957), it seems likely that by the 1840s to 1850s most of the uplands on St. Simons had been through one or more rotations of cultivations and had grown back to pines.

One of the most detailed records of the plantation period is the journal of Fanny Kemble, wife of Pierce Butler, who owned the northwesternmost plantation on St. Simons. In addition to implying that in 1839 very little acreage of oak forest was left on the plantation, she made several references to both intentional and unintentional burning throughout the island. On March 27, 1839, she wrote, "It seemed as if the whole island had been burning at different points for more than a week," noting that while some fires resulted from "careless neglect…sometimes, too, undoubtedly on purpose, the woods are set fire…." Figure 5 displays the total extent of fires she recorded for the period of about a month (mid-March through mid-April, 1839), involving both marshes and woodland.

Figure 5: Fire Locations on St. Simons from Mid-March through Mid-April, 1839 (stars show sites mentioned specifically; shading indicates projected fire extent)



Aside from clearing upland areas for cotton, the planters drained ponds and wetlands. Hazzard (1825) remarked, "In the very thickly wooded parts of the Island of St. Simons near Frederica, are now to be seen many ditches cut in various directions…" The key on an 1835 map states that the ponds on the island are among the best sites for cultivation, once drained. The general pattern during the plantation period was shrinkage or loss of interior wetlands.

7) Abandonment during Civil War: The Civil War brought an abrupt end to cultivation on St. Simons. All the families left the island in 1861 and Confederate troops were withdrawn in 1862. Eventually, some former slave owners returned, but without forced labor and financial capital, the reestablishment of large scale agriculture was impossible. General Robert E. Lee wrote in 1876 of St. Simons, "The houses have been burned and the fences rotted and the fields grown up in weeds." (*in* Torres 1977).

8) Establishment of small farms: Although the trend towards smaller farms had actually started before the Civil War, farm size for coastal Georgia decreased rapidly after the war. (The average acres per farm was 1,030 in 1850 and only 115 acres in 1880.) Beginning in the 1870s, the major industry on St. Simons was harvesting and processing timber, primarily yellow pine. The St. Simons operations milled logs cut on the mainland, but with the mills and a port so close at hand, most of the mature pine on the island was probably cut as well.

9) Economic depression and purchase of land by the Sea Island Company: During the late 19th century, St. Simons began to develop a summer resort trade. Two investors, Eugene W. Lewis and Howard Coffin (who ultimately formed Sea Island Company) from Detroit, began to purchase tracts of land in 1925. Since much of the land they purchased was left undeveloped, several large tracts, including lands across from Fort Frederica, were released from agriculture and logging. Increasing interest in resort development, the economic depression of the 1930s, and the poor financial return of the small family farm encouraged further abandonment of cultivation. Pine succession has proceeded in the abandoned fields around the fort.

10) Establishment of the National Monument and development of St. Simons for housing and recreation: Fort Frederica National Monument was established in 1936. After World War II, the economy of the island expanded greatly through establishment of housing developments, including second homes, and recreational facilities.

Since FOFR entered NPS administration in 1936, all wildland fire within its boundaries has been suppressed. The annual occurrence of wildland fires at FOFR is extremely low; only one documented wildland fire has occurred within park boundaries in the last 28 years. That fire, of miscellaneous cause, occurred on January 7, 1975, burning one acre.

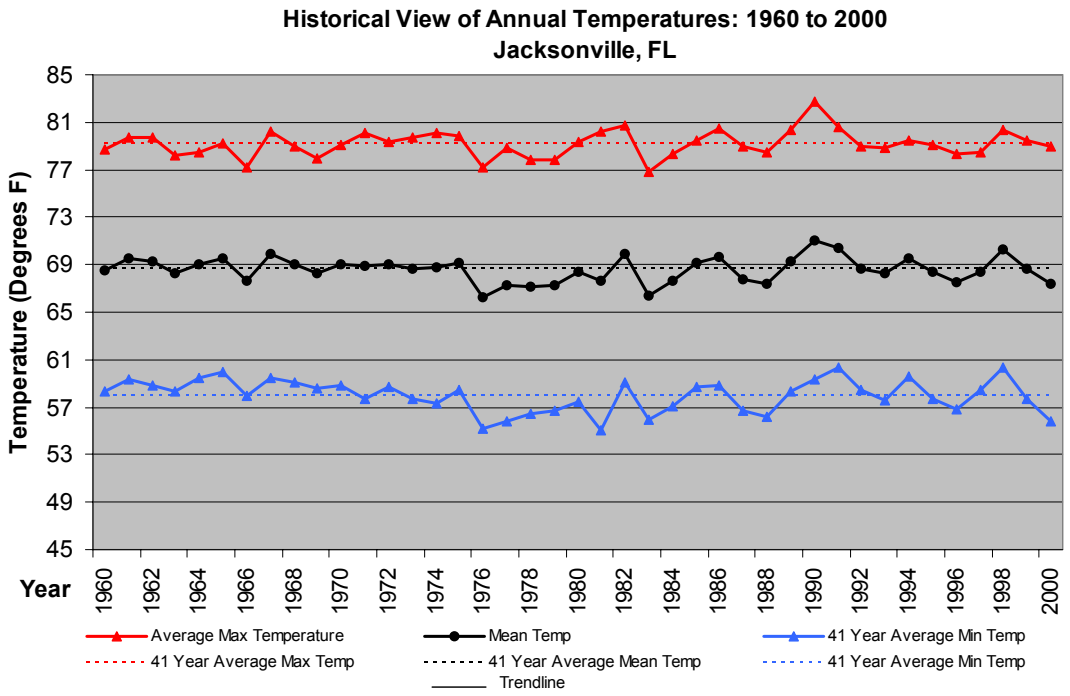
3.4.4 Wildland Fire Management Situation

3.4.4.1 Historical Weather Analysis

The Atlantic coast of the United States from Cape Hatteras, North Carolina to Miami, Florida is somewhat bowl-shaped, with Saint Simons Island at the deepest or westernmost part of the bowl. Due to its relatively distant position in relation to the Gulf Stream and the tendency of hurricanes generated in the Caribbean to follow the Gulf Stream, Saint Simons Island, and thus the park, has for the most part been spared the most destructive results of these storms. Otherwise, the climate is temperate with hot, humid summers and mild winters.

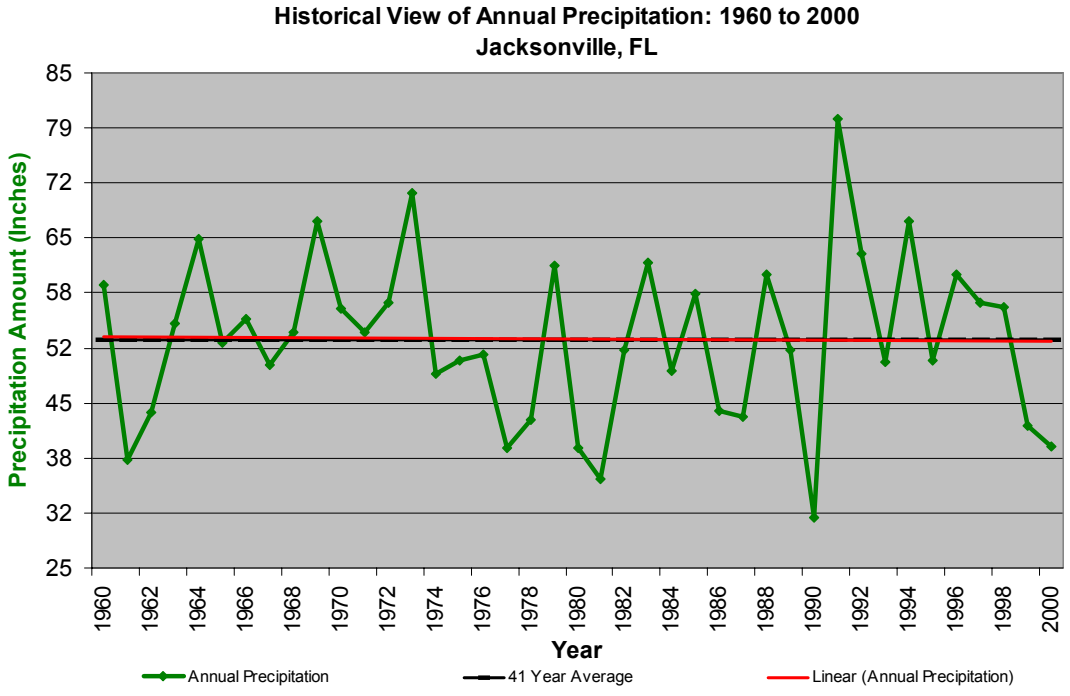
Historic weather data from Jacksonville, Florida, approximately 60 miles to the south, serve as a reasonably accurate indication of historic weather patterns of the park area. For the 41-year time period from 1960 to 2000, the average mean temperature, as indicated in Figure 6, was 68.6 ° F. Although mild warming and cooling cycles have occurred, the temperature has remained quite constant, with no discernible overall warming or cooling trend since 1960.

Figure 6:



The average annual mean precipitation from 1960 to 2000, as indicated in Figure 7, was 52.8 inches. The linear red trend line indicates no discernible overall increase or decrease in precipitation since 1960.

Figure 7:



3.4.4.2 Fire Season

Fire season in the park area is from May 15th to September 30th, as determined by nearby Cumberland Island National Seashore, based upon historic fire occurrence. Available fuels during these time periods include 1-hour through 1000-hour timelag.

3.4.4.3 Fuel Characteristics and Fire Behavior

The primary fuel types represented at FOFR have been classified according to the National Fire Danger Rating System (NFDRS) and the Northern Forest Fire Laboratory Fire Behavior Prediction System (FBPS) (Deeming et al 1978:30, Anderson 1982).

- Fuel Model C: This model (FBPS fuel model 2) represents open pine stands. Perennial grasses and forbs are the primary ground fuel, but there is enough needle litter and branchwood present to contribute significantly to fuel loading and fire intensity. Some brush or shrubs may be present, but they are of little consequence. Surface fires spread primarily through the fine herbaceous fuels, either curing or dead. Fuel model C most closely matches the upland portion of the main park unit.

- Fuel Model E: This model (FBPS fuel model 9) represents hardwood and mixed hardwood-conifer stands where the hardwood predominates after leaf fall. Leaf litter is the primary fuel. High winds will cause higher rates of spread than predicted because of spotting caused by rolling and blowing leaves. Concentrations of dead-down woody material can contribute to possible torching out of trees, spotting, and crowning activity. Fires run through the surface litter faster than fuel model R and have higher flame height. In the summer after the trees have leafed out, fuel model E should be replaced by fuel model R. Fuel model E (and R after the canopy leafs out in the spring) most closely matches the upland portion of the detached Bloody Marsh unit.

- Fuel Model L: This model (FBPS fuel model 1) represents perennial grass. Fire spread is governed by the fine, very porous, and continuous herbaceous fuels that have cured or are nearly cured. Under windy conditions, the fire may be driven into the upper heights of the grass stand. Very little shrub or timber is present (generally less than one-third of the area). Fuel model L most closely matches the area within the historic earthworks of the main park unit.

- Fuel Model N: This model (FBPS fuel model 3) was constructed specifically for the sawgrass prairies of south Florida. This model assumes that one-third of the aerial portion of the plants is dead. Fast-spreading, intense fires can occur even over standing water. Fuel model N most closely matches the marsh areas of the park, vegetated with coarse, reed-like grass.

- Fuel Model R: This model (FBPS fuel model 8) represents hardwood and mixed hardwood-conifer stands where the hardwood predominates after the canopies leaf out in the spring. Slow-burning ground fires with low flame lengths are generally the

case, although the fire may encounter an occasional "jackpot" or heavy fuel concentration that can flare up. Only under severe weather conditions involving high temperatures, low humidities, and high winds do the fuels pose fire hazards.

Table 2 illustrates historic fire weather parameters at "average" and "extreme" levels for the park fire season.

Table 2: Historic Fire Weather Parameters for FOFR Fire Season (May 15 - September 30) NFDRS RAWS Station 098801

Fire Weather/Behavior Parameter	Average Fire Season Weather	97th Percentile Fire Season Weather
20-foot wind speed	3 miles/hour	15 miles/hour
Maximum temperature	91 degrees Fahrenheit	97 degrees Fahrenheit
Minimum relative humidity	58%	35%
1-hour fuel moisture	10%	6%
Live woody fuel moisture	170%	140%

Table 3 demonstrates anticipated fire behavior at FOFR under these average and extreme conditions, as well as critical threshold values influencing fire controllability. The values were calculated using the BEHAVE (Andrews 1986) fire behavior prediction model utilizing weather inputs from the Brunswick weather station on the mainland (NFDRS station 098801). The weather data utilized cover the three-year period from 2001-2003, and the weather indices were calculated using the Fire Family Plus (Bradshaw 2002) software package. It should be recognized that the table values are based upon models rather than direct observation of fire behavior in these fuel types. As FOFR managers have the opportunity to observe and monitor fire behavior, these values may be refined and the model calibrated to better reflect local fuel and weather conditions.

The park uses the Keetch-Byram Drought Index (KBDI) as its primary drought indicator, which, based upon the level, indicates low to extreme drought conditions influencing fire behavior (see section 4.2.2.4.2.2).

Table 3: Potential Fire Behavior Under Average and Extreme Conditions

NFDRS Model	FBPS Model	Fuel Type/Vegetation	Fire Behavior; Average Conditions		Fire Behavior; Extreme Conditions	
			Flame Length (ft)	Rate of Spread	Flame Length (ft)	Rate of Spread
C	2	Perennial grass/forbs under open pine	2	5 chains/hr	*8	63 chains/hr
E	9	Hardwood leaf litter after leaf fall/pine needle litter	1	2 chains/hr	4	15 chains/hr
L	1	Perennial grass	1	10 chains/hr	6	180 chains/hr
N	3	Coarse, reed-like marsh grass	7	30 chains/hr	*16	180 chains/hr
R	8	Hardwood leaf litter after canopy leaf out	0.5	.5 chains/hr	1	3 chains/hr

*Exceeds direct attack capabilities = flame lengths greater than 8 feet; indirect attack required
Average conditions = 2001-2003 NFDRS station 098801 mean fire season weather conditions
Extreme conditions = 2001-2003 NFDRS station 098801 97% percentile fire season weather conditions
Assumes maximum spread with 0% slope

Table 4 outlines potential critical weather parameters that would result in fire behavior exceeding initial attack capabilities (flame lengths greater than eight feet). These values were calculated using the RX Window Module of the BEHAVE program (Andrews 1986). Such values are useful both for facilitating recognition of potential extreme fire behavior conditions, as well as for assisting in prescription development for the prescribed fire program. It should be noted that generally two or three weather parameters must be aligned in order for extreme conditions to result. It should also be noted that these are modeled values and should serve only as guidelines. As the opportunity arises, fire monitoring data collection on both wildland fires and prescribed fires will facilitate refinement of these values, as well as development of critical values for additional parameters. Last, it should be noted that while the values listed will potentially result in flame lengths greater than eight feet, this does not necessarily indicate a sustained, uncontrollable wildland fire. Rather, they indicate that direct attack is not a safe strategy at the head of the fire. Furthermore, these conditions, particularly wind speed, can vary greatly within a short time period and be fleeting in nature.

Table 4: Critical Weather Parameters Resulting in Need for Indirect Attack

NFDRS Model	FBPS Model	Fuel Type/Vegetation	Moisture of Extinction	Critical Weather Parameters Resulting in Fire Behavior Exceeding Direct Attack Capabilities
C	2	Perennial grass/forbs under open pine	15%	1-hr fuel moisture <5% and eye-level wind speed >5 mph
E	9	Hardwood leaf litter after leaf off	25%	1-hr fuel moisture <5% and eye-level wind speed >15 mph
L	1	Perennial grass	12%	1-hr fuel moisture <5% and eye-level wind speed >10 mph
N	3	Coarse, reed-like marsh grass	25%	1-hr fuel moisture <15% and eye-level wind speed >3 mph
R	8	Hardwood leaf litter after canopy leaf out	30%	Flame lengths unlikely to exceed 8 feet even under extreme conditions

Moisture of extinction is defined as the 1-hour fuel moisture upper limit beyond which the fuels described by the given model will not burn. One-hour fuel moisture is a function of temperature, relative humidity, and shading.

3.4.4.4 Fire Regime Alteration

The earlier referenced report entitled *The Vegetation History of Fort Frederica, Saint Simons Island, Georgia* (Bratton 1983), suggests an historic Fire Regime I (0- to 35-year frequency, low severity) for the FOFR area, stating that,

> The historic records indicate that anthropogenic burning was an important disturbance factor on the island, from the aboriginal period to the Civil War. The records mention largely winter and spring burning…and this is likely since the fires were intended to clear brush and rejuvenate the marshes. The lack of extensive stands of pine when the English settlers arrived probably indicates Indian burning kept the savannahs open but rarely caused a crown fire in the surrounding forests….The cutting of the oak forests and the pine succession on abandoned cotton fields greatly increased the availability of fuel in the forested stands. Clearing during the plantation period, in combination with continued anthropogenic ignitions by slaves and others, may thus have increased the frequency, area and intensities of fires on the island. This was presumably followed by a decline in fire frequency, particularly with

acquisition of land by investors who were interested in development for housing or resort facilities rather than in agriculture or logging.

At present, the fire regime is in condition class 2[1], as defined in the USDA Forest Service General Technical Report entitled *Development of Coarse-Scale Spatial Data for Wildland Fire and Fuel Management* (2002). The proposed prescribed burning of approximately 76 acres should begin moving these acres from condition class 2 toward condition class 1[2].

3.4.4.5 Control Problems and Dominant Topographic Features

Weather and fuels are the primary influences on fire behavior at FOFR. Due to the flat topography, fire behavior is not affected by slope or aspect. See section 3.4.5.3 for a discussion of park fuel characteristics and fire behavior, and Table 3 for potential fire behavior under average and extreme conditions.

3.4.5 Fire Management Units (FMUs)

Four fire management units (FMUs) have been identified and established within FOFR in order to facilitate the accomplishment of fire management objectives. Acreages were determined via Global Information System.

3.4.5.1 Fire Management Unit #1: Upland Portion of Main Park Unit

FMU #1 contains approximately 112 acres. As per the preferred alternative of the park General Management Plan and Environmental Impact Statement, this FMU contains four management zones: historic preservation, visitor service, park support services, and natural resource-based passive recreation (see Figure 3 for main park unit management zone locations and Figure 8 for FMU locations).

The historic preservation zone is located within the approximate northern half of the upland portion of the FMU, including the fort/town site and archeological ruins, earthworks, moat, moat bridge, burial ground, and historic military road corridor, as well as the park entrance drive, visitor center/administrative complex, and parking area. The visitor service zone contains a park staff residence, the maintenance compound access road, an archeology education dig site, and a small dock along the Frederica River. The

[1] Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased). This results in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range. Where appropriate, these areas may need moderate levels of restoration treatments, such as fire use and hand or mechanical treatments, to be restored to the historical fire regime.

[2] Fire regimes are within an historical range, and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and function within an historical range. Where appropriate, these areas can be maintained within the historical fire regime by treatments such as fire use.

park support services zone contains the maintenance compound, a park staff residence, the museum storage facility, unimproved roads, power lines, and utilities. The natural resource-based passive recreation zone at the time of this writing contains no developed facilities, but a black powder magazine and loading shed are currently under construction.

3.4.5.1.1 Specific Fire Management Objectives for FMU #1

- Conduct initial attack within 5-10 minutes (response time for the Glynn County Fire Department) of the time a wildland fire report is received.

- Control 95% or higher of all wildland fires during initial attack.

- Conduct prescribed burning of approximately 76 acres for hazard fuels reduction, ecosystem sustainability, and historic landscape restoration and maintenance. This should concurrently begin moving these acres from their current condition class of 2 toward condition class 1.

- Mechanically create and maintain a hazard fuels break along two sections of the park perimeter, bordering residential and commercial property, totaling approximately 2,055 linear feet and 1.6 acres.

- Mechanically create and maintain a 30-foot radius of defensible space around the black powder magazine and loading shed, currently under construction. Total area affected will be approximately .2 acre. Mechanically maintain existing defensible space of 30 to 150 feet around all other park buildings.

3.4.5.1.2 Fuel Characteristics/Fire Behavior

NFDRS fuel models represented within FMU #1 include L within the historic earthworks and C within the surrounding woods. See section 3.4.5.3 for a discussion of park fuel characteristics and fire behavior, and Table 2 for potential fire behavior under average and extreme conditions.

3.4.5.2 Fire Management Unit #2: Marsh Portion of Main Park Unit, East of the Frederica River

FMU #2 contains approximately 53 acres. As per the preferred alternative of the park General Management Plan and Environmental Impact Statement, the marsh composing this FMU is classified as a natural resource protection zone (see Figure 3 for main park unit management zones and Figure 8 for FMU locations). This FMU contains no developed facilities.

3.4.5.2.1 Specific Fire Management Objective for FMU #2

State-owned marsh is located along the northern FMU boundary. As per the statewide reciprocal fire protection memorandum of understanding between the U.S. Department of

the Interior and the Georgia Forestry Commission (GFC), cooperate with the GFC to confine any wildland fire involving FMU #2 within state- and park-owned property boundaries.

3.4.5.2.2 Fuel Characteristics/Fire Behavior

The NFDRS fuel model represented within FMU #2 is N. See section 3.4.5.3 for a discussion of park fuel characteristics and fire behavior, and Table 2 for potential fire behavior under average and extreme conditions.

3.3.5.3 Fire Management Unit #3: Marsh Portion of Main Park Unit, West of the Frederica River

FMU #3 contains approximately 116 acres. As per the preferred alternative of the park General Management Plan and Environmental Impact Statement, the marsh composing this FMU is classified as a natural resource protection zone (see Figure 3 for main park unit management zones and Figure 8 for FMU locations). This FMU contains no developed facilities.

3.4.5.3.1 Specific Fire Management Objective for FMU #3

State-owned marsh extends to the north, south, and west of FMU #3. As per the statewide reciprocal fire protection memorandum of understanding between the U.S. Department of the Interior and the Georgia Forestry Commission (GFC), cooperate with the GFC to confine any wildland fire involving FMU #3 within state- and park-owned property boundaries.

3.4.5.3.2 Fuel Characteristics/Fire Behavior

The NFDRS fuel model represented within FMU #2 is N. See section 3.4.5.3 for a discussion of park fuel characteristics and fire behavior, and Table 2 for potential fire behavior under average and extreme conditions.

3.4.5.4 Fire Management Unit #4: Bloody Marsh Unit

The detached Bloody Marsh unit, located approximately six miles to the south of the main park unit, contains about seven and one-half acres. As per the preferred alternative of the park General Management Plan and Environmental Impact Statement, this FMU contains three management zones: visitor service, natural resource-based passive recreation, and natural resource protection (see Figure 4 for the Bloody Marsh unit management zones and Figure 8 for park FMU locations).

The visitor service zone contains a gated entrance drive, a parking circle, a stone monument, a wayside exhibit, and a kiosk. The natural resource-based passive recreation zone contains a special use permit driveway. The natural resource protection zone contains no developed facilities.

3.4.5.4.1 Specific Fire Management Objectives for FMU #4

- Conduct initial attack within 15-20 minutes (response time for the Glynn County Fire Department) of the time a wildland fire report is received.

- Control 95% or higher of all wildland fires during initial attack.

- In the case of a wildland fire involving the marsh portion of FMU #4, as per the statewide reciprocal fire protection memorandum of understanding between the U.S. Department of the Interior and the Georgia Forestry Commission (GFC), cooperate with the GFC to confine any wildland fire within state- and park-owned property boundaries.

3.4.5.4.2 Fuel Characteristics/Fire Behavior

NFDRS fuel models represented within FMU #4 include E or R within the upland portion, and N within the marsh portion. See section 3.4.5.3 for a discussion of park fuel characteristics and fire behavior, and Table 2 for potential fire behavior under average and extreme conditions.

3.4.6 Values to Protect, Manage, or at Risk

- Human health and safety: Firefighter and public safety is the highest priority in every fire management activity. In light of this:

  - Only fully qualified (i.e. meeting NPS qualifications and accepted interagency knowledge, skills and abilities for the assigned fire job), red-carded employees will be assigned fire management duties (unless assigned as trainees, in which case they will be closely supervised by an individual fully qualified for the given position).

  - No fire management operation will be initiated until all personnel involved have received a safety briefing describing known hazards and mitigating actions (LCES)[3], current fire season conditions, and current and predicted fire weather and behavior. Hazards specific to the park include:

    - Snags and dead trees with weak root systems.
    - Stinging/biting insects, ticks, and poisonous snakes.
    - Dehydration, heat exhaustion and heat stroke.

  - Wildland fire incident commanders and prescribed fire bosses will minimize firefighter exposure to heavy smoke by incorporating the recommendations

[3] LCES is an acronym intended to remind firefighters of the four key elements associated with firefighter safety: Lookouts, Communications, Escape Routes, and Safety Zones.

outlined in the publication *Health Hazards of Smoke* (Sharkey 1997), available from the Missoula Technology and Development Center.

- Prescribed burning will not be conducted when atmospheric conditions exist that could permit degradation of air quality to a degree that negatively affects public health. Federal and state air quality standards will be the basis for this decision.

- Park neighbors, visitors and local residents will be notified of all planned and unplanned fire management events that have the potential to impact them.

- The FOFR superintendent or designee may, as a safety precaution, temporarily close all or part of the park to the visiting public. In the case of prescribed fire, areas needing to be closed for visitor protection will be closed prior to the initiation of prescribed burning.

- Smoke on roadways will be monitored and traffic control provisions taken to ensure motorist safety during fire events at the park. The following procedures will be taken to compensate for reduced visibility when a paved road is affected by smoke (the incident commander or prescribed fire boss on a particular event will determine visibility levels):

  - Posting of "Smoke on Road" signs on either side of the affected area.
  - Reducing the posted speed limit when visibility is strongly reduced, and escorting vehicles with a well-marked law enforcement vehicle as necessary.
  - Closing the road to traffic when visibility is severely reduced.

- Property – To the greatest extent feasible and appropriate, park infrastructure, any other development, and adjacent non-agency land will be protected during all fire management activities.

- Natural and cultural resources – Natural and cultural resources will be protected from the adverse effects of unwanted fire as well as the adverse effects of fire management activities (see section 10.0). During all suppression activities, the minimum impact suppression tactics policy will be incorporated to the greatest extent feasible and appropriate, employing methods least damaging to park resources for the given situation (see section 4.2.7).

- Air and water quality: The park will comply with the Clean Air Act, the Clean Water Act, and all other applicable federal, state, and local laws and requirements. Additionally:

  - The suppression response selected to manage a wildland fire will consider air quality standards.

  - Fire weather forecasts will be used to correlate prescribed fire ignitions with periods of optimal combustion and smoke dispersal. Any smoke situation that

arises and threatens any smoke-sensitive areas will entail ***immediate*** suppression action.

- During fire suppression, water will be used in lieu of fire retardant.

- Because prescribed fire will not be applied under extreme conditions, the probability of denuding the soil will be limited, thereby limiting the possibility of extreme erosion. (The primary threat to water quality is sediments and nutrients resulting from uncontrolled erosion.)

Figure 8 - Park Fire Management Units

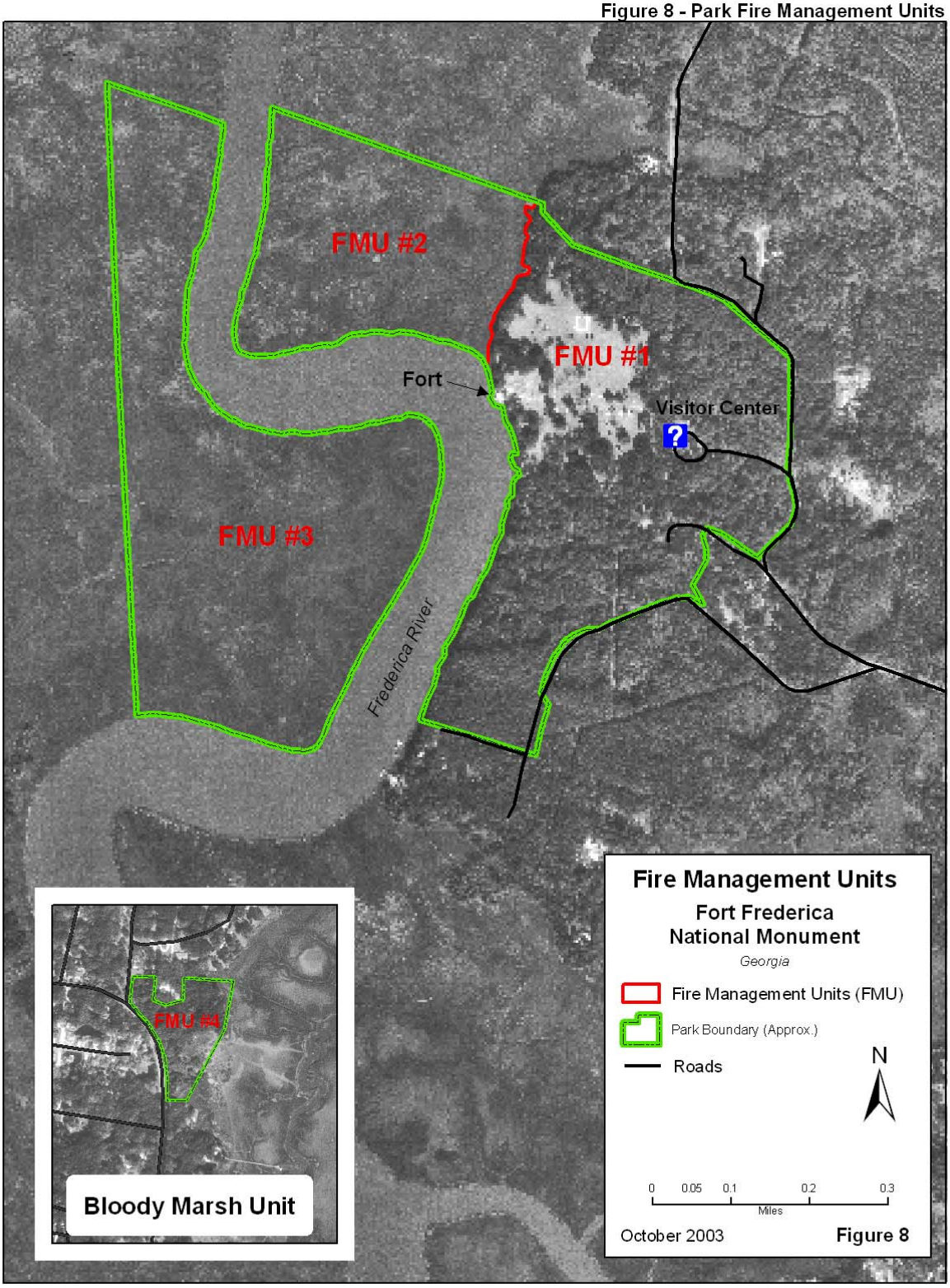
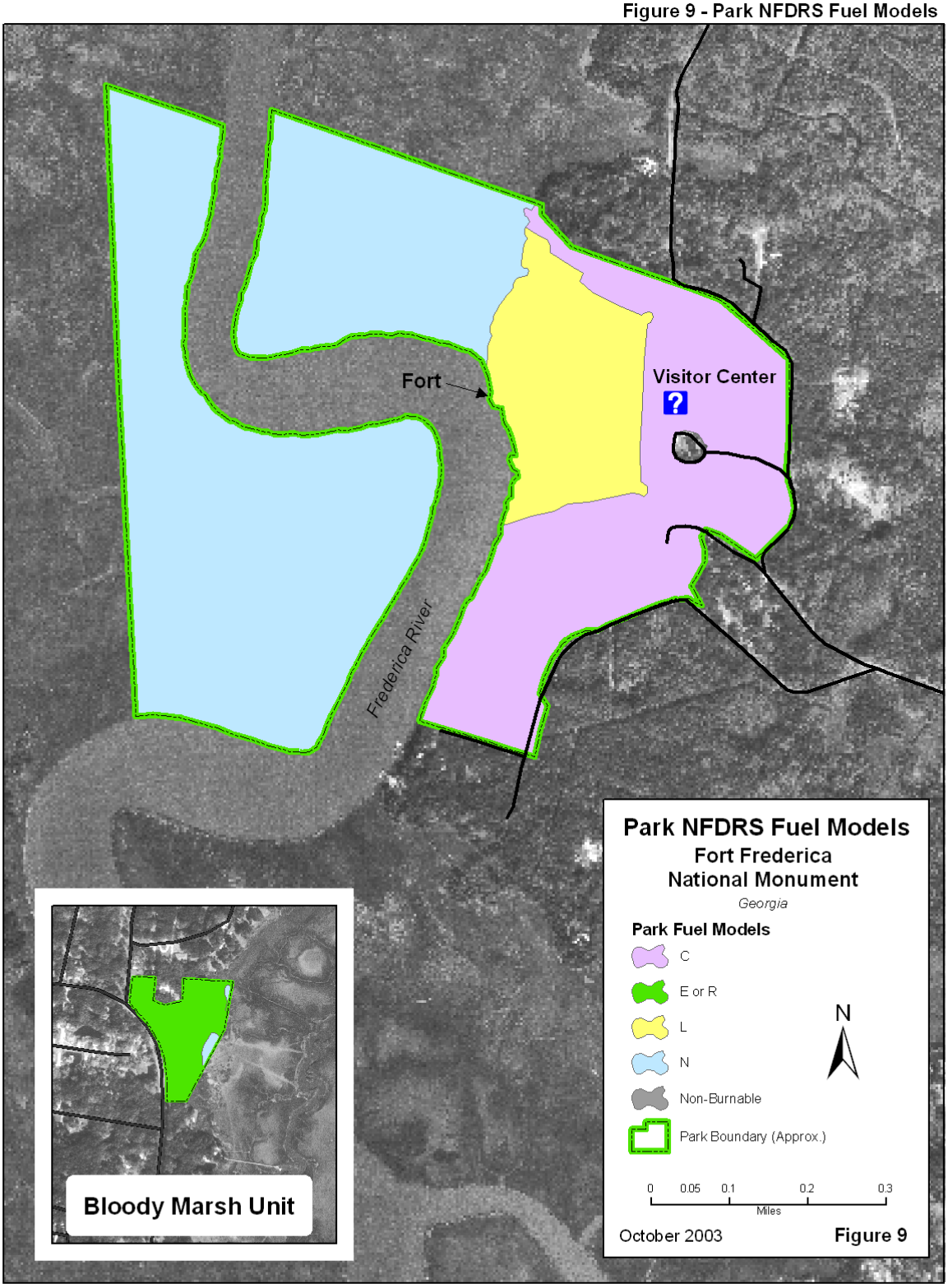


Figure 9 - Park NFDRS Fuel Models



4.0 WILDLAND FIRE MANAGEMENT PROGRAM COMPONENTS

4.1 General Implementation Procedures

As wildland fire will not be used for resource benefits at FOFR, suppression is the only appropriate response to a wildland fire. The requirement for a decision checklist as part of the Stage 1: Initial Fire Assessment of the wildland fire implementation plan (WFIP) is considered to be met at the programmatic level in this Fire Management Plan.

4.2 Wildland Fire Suppression

RM-18 defines wildland fire suppression as "an appropriate management response to wildland fire that results in curtailment of fire spread and eliminates all identified threats from the particular fire. [This may include confinement and/or containment within natural or pre-existing boundaries.] "All wildland fire suppression activities provide for firefighter and public safety as the highest consideration, but minimize loss of resource values, economic expenditures, and/or the use of critical firefighting resources."

4.2.1 Range of Potential Fire Behavior

Weather and fuels are the primary influences on fire behavior at FOFR. Due to the flat topography, fire behavior is not affected by slope or aspect. Depending upon the season and fire weather conditions, fire behavior can range from low-intensity to extreme.

During years of drought or other abnormal environmental conditions, extreme fire behavior can occur, entailing high fire intensity, rapid spread, long flame lengths, spotting, and (in rare cases) torching and crowning. Hardwood brush within the forested portion of the park can act as ladder fuels, facilitating torching, and resulting in undesirable fire behavior such as excessive scorching.

See Table 2 for historic fire weather parameters for FOFR fire season, Table 3 for potential fire behavior under average and extreme conditions, and Table 4 for critical weather parameters resulting in the need for indirect attack. See section 3.4.5.3 for park fuel characteristics and fire behavior.

4.2.2 Preparedness Actions

NPS policy requires that every unit with a fire management program incorporate preparedness considerations into its fire management plan (*RM-18*, chapter 7, provides guidelines). FOFR has no fire-qualified staff, nor any fire-related equipment. The park depends upon cooperating agencies for its wildland fire suppression needs. Preparedness at the park will involve:

- Ensuring that the park has access to additional fire resources as the need arises.

- Maintaining fire records, weather data, maps and other associated information. The park fire management officer (herinafter referred to as the park FMO) will submit FOFR data annually, including daily situation reports during fire events, to the Southeast Regional Office FMO for entry into the Shared Application Computer System (hereinafter referred to as SACS), or the appropriate reporting system. The park FMO will utilize other system options as appropriate to maintain data on employee qualifications, hazard fuels, FIREPRO, etc.

- Preparing a pre-season risk analysis.

- Maintaining detection capabilities. Fire detection will be accomplished primarily by park field personnel, with additional input from visitors, cooperators and adjacent landowners.

4.2.2.1 Fire Prevention Activities

Prevention activities, designed to minimize the occurrence of human-caused wildland fires at the park, generally fall within one of three broad categories, as follows (*RM-18*, chapter 8, provides guidance):

- Education – Educating the public regarding the importance of wildland fire prevention can change people's behavior. Park methods include signs, posters, bulletin boards, and face-to-face contacts with visitors, all of which facilitate public awareness, understanding, and support.

- Engineering – Engineering involves reducing or eliminating fire risks (ignition sources) and hazards (fuels). Park methods include creating and maintaining defensible space ranging from 30 to 150 feet around all buildings, utilizing fire-safe roofing materials on most buildings, and using prescribed fire and non-fire applications to reduce hazard fuels accumulations.

- Enforcement – Enforcement involves activities that ensure compliance with fire regulations and ordinances (including public use and access restrictions during times of high fire danger). Any wildland fire at the park will be investigated, both to identify the responsible party if human-caused, and to gain information that can be applied to future prevention efforts.

A wildland fire prevention plan is included as Appendix 13.11. This plan outlines specific activities related to public education, engineering, and enforcement, based upon an analysis of the park's wildland fire risks, hazards and values.

4.2.2.2 Annual Training Needs of Fire Staff

NPS fire management training meets criteria specified within the training curriculum approved by the National Wildland Coordination Group (NWCG), which is tiered to positions described in the NWCG *Wildland Fire Qualifications*, *Prescribed Fire Job Qualifications*, and *Incident Command System Wildland Fire Job Performance* guides.

The park FMO will conduct annual training need analyses, and coordinate training courses as appropriate. Courses identified will be based upon employee needs (as reflected in individual employee development plans), park fire management needs, and regional priorities. Training will be conducted on an interagency basis to the greatest extent possible. Any future fireline-qualified park staff (there are none presently) will receive at least eight hours of annual safety refresher training (see section 8.1).

The park FMO will submit all pertinent employee data to the Southeast Regional Office FMO for entry into IQCS (or the appropriate reporting system).

4.2.2.3 Annual Equipment and Supply Readiness Procedures

As previously stated, FOFR has no fire-qualified staff, nor any fire-related equipment. The park depends upon cooperating agencies for its wildland fire suppression needs.

4.2.2.4 Fire Weather and Fire Danger

4.2.2.4.1 Weather Station

The park FMO will access weather data from Georgia Forestry Commission website http://weather.gfc.state.ga.us./Maps.html, which provides pertinent fire danger parameters for general and specific geographical areas within the state, daily (1300 EST) observation maps (including fire danger ratings for those areas), and twice-daily forecast maps.

4.2.2.4.2 National Fire Danger Rating System

The National Fire Danger Rating System (NFDRS) enables a land management unit to determine fire danger based upon an evaluation of the upper limit of predicted fire behavior. Calculations of fire behavior are based on fuels, topography and weather. NFDRS outputs give relative ratings of potential wildland fire growth and behavior, thereby allowing a unit to systematically correlate its readiness level to the predicted fire problems of the day. The Georgia Forestry Commission uses the burning index (also the NPS standard) as its primary day-to-day indicator of the potential amount of effort needed to suppress a single fire in a particular fuel type within a given area, and the Keetch-Byram Drought Index as its primary drought indicator. Both of these indices influence decisions regarding prevention activities, initial attack, extended attack, and prescribed fire activities.

4.2.2.4.2.1 Burning Index

The burning index (BI) is a number on an open-ended scale (although typically between 0 and 100), expressing the potential amount of effort needed to suppress a single fire in a particular fuel type within a given area. BI is based upon fuel model, fuel moisture, and current and forecasted weather parameters. As the BI increases, expected fire intensity

increases. The higher the expected fire intensity, the more effort that will be necessary for fire suppression.

4.2.2.4.2.2 Keetch-Byram Drought Index (KBDI)

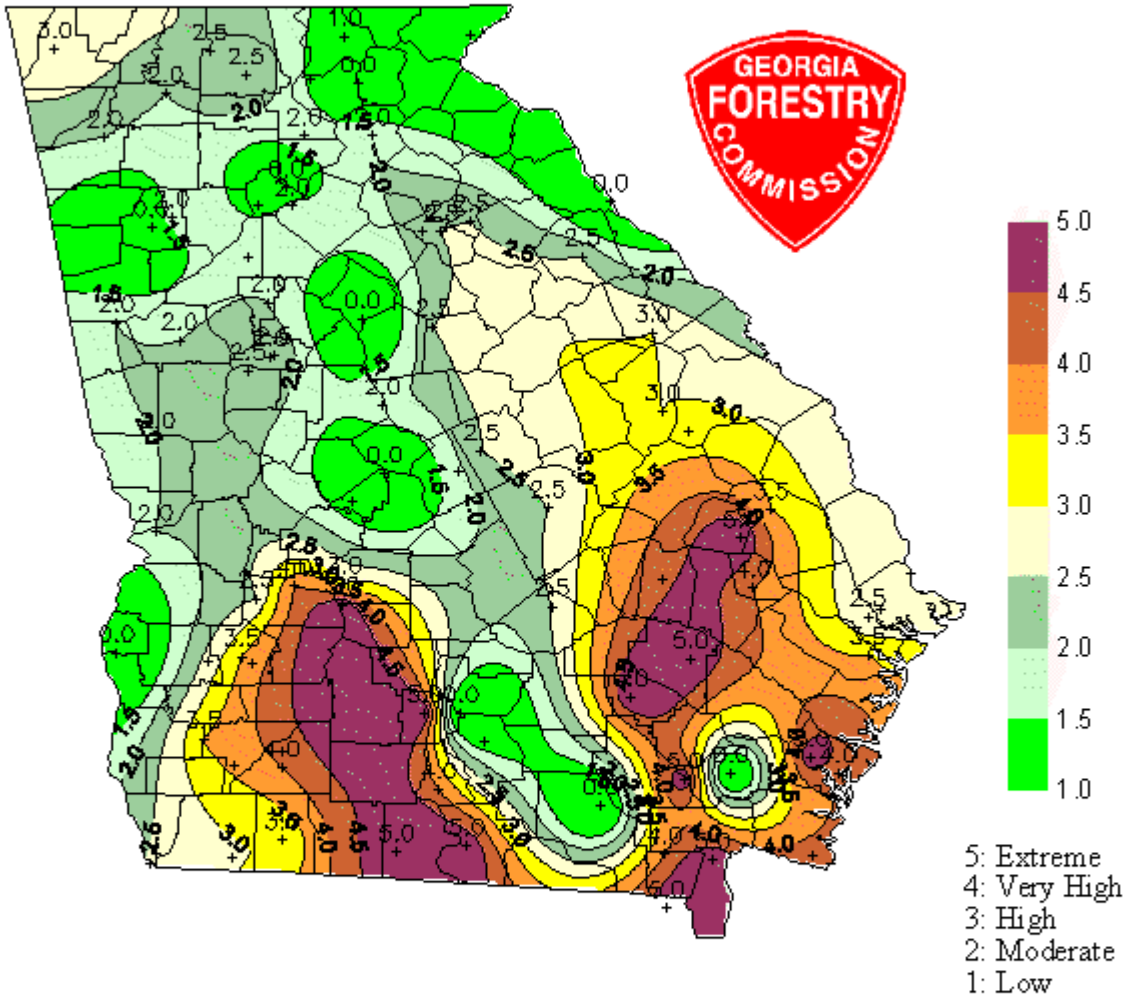
The KBDI is a mathematically-calculated drought indicator relating to the amount of moisture in the top seven inches of soil or duff. It ranges from 0-800, with 0 being saturated and 800 indicating maximum drought. Drought directly influences the flammability of all fuel/vegetation complexes (as drought progresses the upper soil layers dry, increasing the amount of dead and cured live fuels available for consumption), which in turn influences fire behavior and control efforts. For a description of fire behavior and effects that can be expected at increasing levels of drought in the southeast, see website http://www.tncfire.org/resource/keetch.htm.

4.2.2.5 Step-Up Staffing Plan

The park FMO will access website http://weather.gfc.state.ga.us./Maps.html to ascertain the Georgia Forestry Commission-determined fire danger level for the given day. The Georgia Forestry Commission (GFC) bases these levels upon increasing burning index values. Figure 10, below, is an example of a fire danger rating map that the GFC posts daily. As previously discussed, the park depends upon cooperating agencies for its wildland fire suppression needs. It has no firefighting staff nor equipment that would factor into a traditional step-up staffing plan.

Figure 10:

Fire Danger Rating
as of April 14, 2004 230pm



The Georgia Forestry Commission meteorologist produces the above map each afternoon at 230pm by utilizing National Fire Danger Rating System output from weather station locations across Georgia. Values are interpolated between the stations to produce the map.
The system is designed to cover large geographical areas. Localized conditions may differ from the above map based on local rainfall, windspeeds, and relative humidity.

For more detailed information select 'weather' on our web site.

If you have questions contact Daniel Chan at 1-800-GATREES.

ONPS and FIREPRO fund routine preparedness actions. Emergency preparedness funds are available from the Southeast Regional Office (SERO) to accomplish approved activities for very high to extreme conditions. If severity funding is necessary, the park FMO will submit a written assessment of the current and potential situation, including a description of mitigating actions and costs to the SERO FMO.

4.2.3 Pre-Attack Plan

RM-18, chapter 7, provides a pre-attack planning checklist that will serve as a reminder of various elements to be considered at the park (as applicable) upon reaching very high to extreme fire danger/readiness levels.

4.2.4 Initial Attack

In the case of a wildland fire at FOFR, the Glynn County Fire Department (GCFD), will most likely respond. However, as per a statewide reciprocal fire protection memorandum of understanding between the U.S. Department of the Interior (National Park Service and U.S. Fish and Wildlife Service) and the Georgia Forestry Commission, responders could also include the firefighters from the Okefenokee National Wildlife Refuge and the Georgia Forestry Commission (Glynn County). In coordination with the park FMO, the responder(s) will develop an appropriate management response to the incident, organize and direct the fire resources on hand toward safe, efficient implementation of that response, monitor the effectiveness of the suppression tactics, and adjust strategy and tactics accordingly. The responder(s) will be responsible for the fire until it is out or until being relieved of duty via a formal command change.

4.2.4.1 Information Used to Set Initial Attack Priorities

The goal in all initial attack actions is to suppress the fire in a cost-effective manner, consistent with resource management objectives. Initial attack priorities at FOFR are tiered to firefighter and public safety (the highest priority in every fire management activity), and the threat that the wildland fire poses to park values. Factors considered in assessing the degree of threat that the fire poses include the fire location, fuels, current and forecasted weather, and current and predicted fire behavior. When multiple fires are reported, fires occurring in the wildland-urban interface will take priority over fires occurring in natural areas.

4.2.4.2 Criteria for Appropriate Initial Attack Response

The appropriate initial attack response will be determined from an analysis of the given situation, and must be consistent with the park's general and resource management objectives. Factors dictating the appropriate management response include firefighter and public safety, fire location, current and predicted fire weather/fire behavior, park values at risk, cost-effectiveness, and potential adverse effects of both the fire and suppression efforts.

The appropriate initial attack response will vary from fire to fire, and sometimes even along the perimeter of the same fire. Options range from monitoring with minimal on-the-ground disturbance to aggressive suppression actions along the entire fire perimeter.

4.2.4.3 Confinement as an Initial Attack Suppression Strategy

A confinement strategy may be implemented as the initial attack action as long as it is not used to meet resource objectives. Confinement is selected in lieu of wildland fire use to maximize firefighter safety, minimize suppression costs, minimize cost + loss in low-valued and commodity resource areas, and to maximize availability of critical suppression and management resources during periods of high fire danger associated with fire in highly-valued resource areas.

Confinement may also be a strategic selection through the wildland fire situation analysis (WFSA) process when a fire is expected to exceed initial attack capability or planned management capability. When confinement is selected as the initial action, the same management process applies as for wildland fire use decisions. A long-term implementation plan is needed to guide the implementation of the confinement strategy. The wildland fire implementation plan (WFIP), prepared in stages, meets this requirement.

4.2.4.4 Typical Fire Response Time

From the time a fire report is received, the response time for the Glynn County Fire Department to a fire at FOFR should take from 5-20 minutes; the response time for Georgia Forestry Commission (Glynn County) firefighters should take from 45 minutes to one hour; and the response time for Okefenokee National Wildlife Refuge firefighters should take from 20 minutes (by air) to one and a half hours (by ground).

4.2.4.5 Restrictions and Special Concerns

Chainsaws, hand tools and drip torches may be used at any time for fire management purposes, to the extent that their use is unlikely to affect readily visible archeological or historical resources. Fire engines or slip-on units may be used as water sources, provided that they stay on existing roads. Water will be used in lieu of fire retardant. Heavy equipment such as bulldozers and plows for constructing fireline will not be used at the park, nor will fireline explosives.

4.2.4.6 Work/Rest Guidelines, Rest and Recuperation

The *Interagency Incident Business Management Handbook* (chapter 10, section 12.6) provides comprehensive direction on work/rest guidelines and rest and recuperation (R&R). It also provides guidance on the application of management-directed days off for employees at their home units. Management of work schedules, directed days off and R&R will be incorporated as appropriate into FOFR fire management activities to give

personnel proper rest so they remain productive, mentally alert, and physically capable of performing their jobs safely.

4.2.5 Extended Attack and Large Fire Suppression

4.2.5.1 Determination of Extended Attack Needs

Extended attack occurs when a wildland fire has not been controlled by initial attack forces, and additional firefighting resources are arriving, en route, or being ordered by the initial attack incident commander. It requires a wildland fire situation analysis (WFSA) to guide a re-evaluation of suppression strategies. The WFSA process determines current fire complexity and facilitates selection of a new management response, which in turn determines the number and type of resources needed for extended attack. Extended attack continues until the fire has been suppressed, or until transition to a higher-level incident management team is completed.

4.2.5.2 Implementation Plan Requirements—WFSA Development

A WFSA, required when extended attack occurs, serves as the decision record for selection of the appropriate management response. Whenever reasonable doubt exists regarding the successful outcome of an initial attack response, the park FMO will immediately begin a WFSA.

4.2.5.3 Complexity Decision Process from Initial to Extended Attack

One of the WFSA components is a fire complexity analysis guide. This guide contains specific yes/no questions regarding fire elements, including current and predicted fire behavior, resources committed, resources threatened, safety, ownership/jurisdiction, external influences, change in strategy, and existing overhead. The total number of positive responses to the questions determines the complexity/management level of the fire, i.e. type I, type II, or type III. The incident commander will submit the WFSA to the park superintendent for approval. If fire complexity dictates, the park FMO will request an interagency incident management team (type I or II) through the Georgia Interagency Coordination Center.

4.2.5.4 Incident Commander Delegation of Authority

When an incident management (IM) team is mobilized to a FOFR fire event, the park FMO will coordinate the transition of authority for suppression actions, and serve as agency advisor to the team during their time on the incident. The park superintendent will execute a written limited delegation of authority to the incoming incident commander, which will be included in the briefing package provided to the incoming IM team. The park superintendent will also conduct the eventual close-out and evaluation of the team. Appendix 13.7 includes a copy of the FOFR limited delegation of authority for an incoming incident commander.

4.2.6 Exceeding Existing WFIP, Selecting New Strategy

The existing wildland fire implementation plan (WFIP) is exceeded when a wildland fire escapes initial attack or when the appropriate management response has not been successful, or when a prescribed fire can no longer be implemented in accordance with the approved plan. A wildland fire situation analysis (WFSA) will be used to determine a new appropriate management strategy.

4.2.7 Minimum Impact Suppression Tactics

NPS policy requires fire managers and firefighters to select management tactics commensurate with a wildland fire's existing or potential behavior, but which cause as little impact to natural and cultural resources as possible. All suppression activities at FOFR will therefore incorporate the minimum impact suppression tactics policy, to the greatest extent feasible and appropriate for the given situation. Examples of minimum impact suppression tactics that will be implemented include:

- Keeping fire engines or slip-on units on existing roads.
- Not using heavy equipment (e.g. bulldozers, plows) for constructing fireline.
- Not using fireline explosives.
- Using existing natural fuel breaks and human-made barriers, wet line, or cold trailing the fire edge in lieu of handline construction whenever possible.
- Keeping fireline width as narrow as possible when it must be constructed.
- Avoiding ground disturbance within known natural and archeological/cultural/historic resource locations. When fireline construction is necessary in proximity to these resource locations it will involve as little ground disturbance as possible and be located as far outside of resource boundaries as possible.
- Using water in lieu of fire retardant.
- Using soaker hose, sprinklers or foggers in mop-up; avoiding boring and hydraulic action.
- Minimizing cutting of trees.
- Scattering or removing debris as prescribed by the incident commander.
- Protecting air and water quality by complying with the Clean Air Act, the Clean Water Act, and all other applicable federal, state, and local laws and requirements.

RM-18, chapter 9, provides minimum impact suppression tactics guidelines. The park FMO will provide input in the selection and implementation of minimum impact suppression tactics for any wildland fires that go into extended attack.

4.2.8 Rehabilitation Guidelines and Procedures

Fire rehabilitation involves short-term actions (generally 0-6 months) to stabilize a burned area and mitigate the effects of fire suppression activities. Immediate rehabilitation actions to prevent further land degradation or resource loss, or to ensure safety, may be undertaken as part of the incident. Rehabilitation action at the park will

typically involve removing any trash and debris from an incident location and along the fireline.

Rehabilitation actions may be funded through emergency fire operations accounts. The park FMO will plan major rehabilitation efforts, which cannot be undertaken during or immediately after an incident, for implementation as soon as feasible.

4.2.9 Reporting and Documentation

When FOFR reaches Georgia Forestry Commission-determined very high to extreme readiness levels, or upon confirmation of a wildland fire on park land, the park FMO will notify the Southeast Regional Office FMO of such at the earliest possible time. During a fire event, the park FMO will submit a daily situation report to the Southeast Regional Office FMO for entry into SACS (or the appropriate reporting system). The park FMO will also complete a final record for each wildland fire, to be kept on file at FOFR, which will include:

- Individual fire report DI-1202
- Narrative
- Wildland fire implementation plan
- Daily weather forecasts and spot weather forecasts
- Cumulative fire map showing acreage increase by day
- Total cost summary
- Monitoring data

GPS/GIS data should be the norm for recording location information whenever practical.

4.3 Prescribed Fire

Prescribed fire at FOFR will be used on approximately 76 acres to reduce hazard fuels accumulations, to promote ecosystem sustainability, and to restore and maintain the historic landscape. The prescribed fire program will be tiered to resource management objectives. Permissible prescribed fire intensity will be based upon the desired fire effects specified in the burn prescription.

4.3.1 Planning and Documentation

Prior to all FOFR prescribed fires, the park FMO will obtain a burning permit from the Georgia Forestry Commission. Nearby landowners and other interested parties, such as local law enforcement and fire departments, will be notified prior to and on the day of the planned ignition.

Go/no-go documents, one for FOFR superintendent approval and the other for the prescribed fire burn boss, will be completed and signed prior to executing a prescribed fire. The superintendent's go/no-go approval is the final management approval prior to ignition of the prescribed fire. It is valid for up to 30 days after the approved date; if

ignition does not occur prior to expiration of the superintendent's approval, a new go/no-go approval document will be completed.

The prescribed fire operations go/no-go checklist is the final operational confirmation that all requirements of the prescribed fire plan have been met, and conditions are appropriate for initiation of the prescribed fire (i.e. do we commence with firing or not?). This checklist will be used as a daily validation until ignition is completed, and there are no existing or eminent threats to the fireline/project boundary.

4.3.1.1 Annual Activities for Preparation and Implementation of Prescribed Fire Program

Table 5: Annual Prescribed Fire Program Activities

	Jan	Feb	Mar	April	May	Jun	July	Aug	Sept	Oct	Nov	Dec
Access weather data daily.	x	x	x	x	x	x	x	x	x	x	x	x
Complete project accomplishment reports.	x	x	x	x	x	x	x	x	x	x	x	x
Review prescribed fire program.	x											
Conduct prescribed burning.		x	x	x								
Submit fuels management funding requests.				x								
Submit FIREPRO funding requests.						x						

4.3.1.2 Long-Term Prescribed Fire Strategy

See Appendix 13.10 for FOFR's five-year fuels treatment plan.

4.3.1.3 Personnel Requirements for Program Implementation

Via intra- and interagency coordination, the park FMO will obtain qualified prescribed fire personnel, and will also obtain any necessary regional and national clearance for use of such personnel. A certified prescribed fire burn boss is required to implement every prescribed fire at the park. The burn boss type (RXB1, RXB2) will be determined via the prescribed fire complexity rating process (see *RM-18*, chapter 10). The burn boss may be from another agency as long as s/he is qualified to burn in the fuel type of the proposed prescribed fire. The burn boss will use the complexity rating process to determine the minimum type, number and response time of holding resources. Prescribed fire crewmembers will each be minimally qualified at the type II firefighter level. Burn bosses and all other positions assigned to prescribed fires at the park will meet all national requirements for training and experience.

4.3.1.4 Prescribed Fire Monitoring

See section 6.3 for a discussion of monitoring.

4.3.1.5 Prescribed Fire Project Critiques

See section 11.1 for a discussion of wildland fire and prescribed fire critiques.

4.3.1.6 Reporting and Documentation Requirements for Accomplishments and Escaped Fires

The burn boss on a prescribed fire will document the fire with the following information, stored individually in FOFR files:

- Original signed prescribed fire plan
- Checklist of pre-burn prescribed fire activities
- All reviewer comments
- All maps
- Notification checklist
- Permits (e.g. burn, smoke, etc.)
- Monitoring data
- Weather forecasts
- Agency administrator go/no-go pre-ignition approval
- Operational go/no-go checklist
- Incident action plan(s)
- Unit logs, daily validation, or other unit leader documentation
- Press releases, public comments, complaints
- Smoke dispersal information
- Post-fire critique
- Individual fire report Fire DI-1202, completed by the burn boss and submitted to the Southeast Regional Office FMO for entry into SACS (or the appropriate reporting system) within 10 working days after the fire has been declared out

4.3.1.7 Prescribed Fire Plan

An individual plan is required for every prescribed fire application. The park will use the prescribed fire plan format provided in *RM-18*, chapter 10, Wildland and Prescribed Fire Management Policy and Implementation Procedures Reference Guide.

4.3.2 Exceeding Existing Prescribed Fire Plan

If a prescribed fire can no longer be implemented in accordance with the approved plan, the entire prescribed fire area will be declared a wildland fire, and suppression action taken. All subsequent action (i.e. initial incident commander, operational needs, notifications, strategies, resource orders, etc.) will be defined under the wildland fire transition plan, included in the prescribed fire plan. The contingency plan should be tiered to the worst-case scenario, utilizing current fire behavior processing systems for the fuel types and conditions outside the burn block and adjacent to the project area. In the event that the contingency plan is unsuccessful, the incident commander will develop a WFSA (see section 4.2.5.2).

4.3.3 Air Quality and Smoke Management

As a chemical air pollutant, smoke is subject to scrutiny under federal legislation established by the Environmental Protection Agency. In addition to posing health risks, smoke can reduce visibility many miles away from its source, affecting the safe operation of automobiles and aircraft and diminishing the quality of scenic views.

As previously stated, FOFR is designated a class II air shed under the Clean Air Act. Under class II, modest increases in air pollution are allowed beyond baseline levels for particulate matter, sulfur dioxide, nitrogen and nitrogen dioxide, provided that the national ambient air quality standards, established by the Environmental Protection Agency (EPA), are not exceeded. The fire management program at FOFR will manage smoke in compliance with the Clean Air Act and Georgia State requirements, so as to minimize its effects on park visitors, firefighters, adjoining lands and neighbors, natural and cultural resources, and roads and highways. Smoke management will be incorporated into all FOFR fire management planning and operations. Each prescribed fire plan will include smoke trajectory maps and identify smoke-sensitive areas. Fire weather forecasts will be used to correlate ignitions with periods of optimal combustion and smoke dispersal. Mitigation measures will be defined in the plan and arrangements made prior to ignition to ensure that designated resources are available if needed to implement the mitigation measures. Prescribed fire will not be implemented when atmospheric conditions exist that could permit degradation of air quality to a degree that negatively affects public health. (Federal and state air quality standards will be the basis for this decision.) Any smoke situation that arises and threatens any smoke-sensitive areas will entail ***immediate*** suppression action.

Smoke on roadways will be monitored and traffic control provisions taken to ensure motorist safety during fire events at the park. The following procedures will be taken to compensate for reduced visibility when a paved road is affected by smoke (the incident commander or prescribed fire boss on a particular event will determine visibility levels):

- Posting of “Smoke on Road” signs on either side of the affected area.
- Reducing the posted speed limit when visibility is strongly reduced, and escorting vehicles with a well-marked law enforcement vehicle as necessary.
- Closing the road to traffic when visibility is severely reduced.

4.4 Non-Fire Fuel Treatment Applications

Non-fire fuels management at the park includes mechanical techniques to maintain open areas and historic vistas, to reduce hazard fuels accumulations, and to create and/or maintain defensible space of at least 30 feet around all park buildings.

Hazard fuels reduction at the park will be conducted in association with the Wildland Urban Interface Initiative. Hazard fuels accumulations will be mechanically reduced

along two sections of the main park unit perimeter, bordering residential and commercial property, for a total of approximately 2,055 linear feet and 1.6 acres. (These two fuels breaks will additionally serve as holding lines for prescribed fire.) The northern perimeter fuel break will be created by bush hogging/chainsawing a 12-foot wide corridor along the perimeter itself, and mechanically reducing (selectively thinning by chainsaw) hazard fuels accumulations inside of that corridor for an additional 30 feet, creating a shaded fuel break. A ~12-foot wide driveway runs along the majority of the southern park perimeter. Where the driveway does not exist, a 12-foot wide corridor will be chainsawed/bush hogged along the perimeter itself. Hazard fuels will be mechanically reduced (selectively thinned by chainsaw) inside of that break and inside of the driveway for an additional 30 feet, creating a shaded fuel break.

Hazard fuels accumulations will be mechanically (bush hogged/chainsawed) reduced to create and maintain a 30-foot radius of defensible space around a black powder magazine and a loading shed, both under construction at the time of this writing. Total area affected will be approximately .2 acre.

In all cases, fuels considered to be "hazards" will primarily be dead and down timber, ladder fuels, undergrowth and fallen limbs, briars, and brush/timber of less than 6 inches dbh (diameter at breast height). Remaining live trees will be limbed to approximately 12 feet from the base of tree. All down trees larger than 24 inches in diameter may remain in the fuel break, but must lie flush to the ground, with limbs cut and removed. All debris will be hauled from the park to an approved location.

4.4.1 Annual Activities for Preparation and Implementation of Program

Table 6: Annual Non-Fire Applications Program Activities

	Jan	Feb	Mar	April	May	Jun	July	Aug	Sept	Oct	Nov	Dec
Inspect/maintain equipment.	x	x	x	x	x	x	x	x	x	x	x	x
Create/maintain defensible space around buildings.	x	x	x	x	x	x	x	x	x	x	x	x
Create/maintain hazard fuels breaks.	x	x	x	x	x	x	x	x	x	x	x	x
Complete project accomplishment reports.	x	x	x	x	x	x	x	x	x	x	x	x
Review non-fire applications program.	x											
Mow open areas/historic vistas.			x	x	x	x	x	x	x	x	x	
Submit fuels management funding requests.				x								

4.4.2 Equipment and Seasonal Use Restrictions

Section 4.2.4.5 discusses equipment restrictions pertaining to fire management activities at the park.

4.4.3 Effects Monitoring

The park will coordinate effects monitoring with Southeast Regional Office fire staff.

4.4.4 Project Critiques

Southeast Regional Office fire staff will review and critique ongoing projects at the park, ensuring that the non-fire applications program is meeting its objectives, and that projects are as cost-effective as possible for the given objectives and circumstances.

4.4.5 Cost Accounting

Creation/maintenance of defensible space, and maintenance of open areas and historic vistas are ONPS-funded activities. Hazard fuels reduction funding is available through Wildland Urban Interface, Hazard Fuels (both distributed by the National Interagency Fire Center in Boise), and PMIS. The park FMO will ensure that expenditures are tracked in the appropriate accounting system.

4.4.6 Reporting and Documentation

The park FMO will document all non-fire applications at the park, and report accomplishments to the Southeast Regional Office FMO for entry into SACS (or the appropriate reporting system).

4.4.7 Annual Planned Project List

See Appendix 13.10 for FOFR's five-year fuels treatment plan.

4.5 Emergency Rehabilitation and Restoration

Burned area emergency stabilization and rehabilitation actions are intended to protect public safety, stabilize and minimize unacceptable change to biotic communities and imminently threatened cultural resources (treatment to prevent further erosion of sites; not inventory or mitigation of sites), improve ecosystem structure and function according to approved field unit management plans, and repair or replace minor facilities damaged or destroyed by a wildland fire. Burned area rehabilitation (BAR) subactivity funds can only be used for treatments on agency lands within the perimeter of the fire or impact area downstream from the burned area. The use of BAR funding is further limited based on treatment effectiveness and to improve economic efficiencies. The Interagency Burned Area Emergency Stabilization and Rehabilitation Handbook provides treatment guidance and standards.

5.0 ORGANIZATIONAL AND BUDGETARY PARAMETERS

5.1 Fire Management Team Member Responsibilities[4]

SUPERINTENDENT

- Approves:
  - Park fire management plan.
  - Delegation of authority/briefing statement for incoming incident management teams.
  - Prescribed fire plans.
  - Wildland fire situation analysis.
- Ensures that:
  - All aspects of the park fire management program are effectively planned and implemented.
  - The park fire management plan is reviewed and revised as necessary.
  - An adequate number of trained and qualified personnel is available, via intra- and interagency cooperation, to meet park fire management needs.
- Conducts a post-fire critique of every wildland and prescribed fire at the park.
- Establishes and maintains cooperative relationships with the public, media, other agencies, and park neighbors regarding FOFR's fire management program.
- May, as a safety precaution, temporarily close all or part of the park to the visiting public in the case of a wildland fire or as necessary during prescribed fire operations.

CHIEF RANGER/PARK FMO

- Plans, coordinates and implements all aspects of the park fire management program, including:
  - Coordinating completion of preparedness tasks.
  - Conducting fire management budgeting process, requesting and tracking emergency preparedness and suppression expenditures, and fuels management accounts.
  - Maintaining fire-related computer files and submitting data to the Southeast Regional Office FMO.
  - Obtaining weather data.
  - Apprising park staff of state-determined fire danger/readiness levels, and any fire management activities.

[4] One individual may act in more than one of these roles.

- Providing fire-related input to park superintendent, including research proposals, and recommending restrictions/area closures, as appropriate, when fire danger reaches critical levels.
- Preparing delegation of authority for park superintendent's signature, and coordinating with incoming incident management teams.
- Ensuring that only NWCG-qualified personnel are assigned to fire management activities at FOFR.
- Requesting additional fire resources as necessary through the GA Interagency Coordination Center.
- Collaborating with park superintendent to ensure that fire-related MOUs and cooperative agreements are updated/revised as appropriate.
- Enforcing any temporary park closures or restrictions.

RESOURCES SPECIALIST

- Continues coordination with the U.S. Fish and Wildlife Service to ensure that FOFR has the most current data regarding identified sensitive, proposed, and listed species, as well as any proposed or designated critical habitat areas within its boundaries. Provides recommendations on how to mitigate adverse effects to these resources during fire management activities. Coordinates any necessary compliance with Section 7 of the Endangered Species Act.

- Continues coordination with the Southeast Archeological Center to ensure that FOFR has the most current data regarding archeological resources within its boundaries. Provides recommendations on how to mitigate adverse effects to these resources during fire management activities. Coordinates any necessary compliance with Section 106 of the National Historic Preservation Act.

- Provides input regarding minimum impact suppression tactics.

- Provides input regarding the fire monitoring program to ensure that prescribed fire at FOFR effectively meets overall objectives.

LAW ENFORCEMENT OFFICER (provided via intra- or interagency cooperation)

- Investigates all wildland fire ignitions at the park.

- Conducts evacuations, controls/escorts traffic, and performs other public safety duties as needed during wildland fire events.

ADMINISTRATION

- Notifies park superintendent and FMO of smoke/fire reports.

- Acts as communication center during ongoing fire management activities.

5.2 FIREPRO Funding

FIREPRO funds are separate from the ONPS appropriation, and must be utilized for fire-dedicated functions. Base funding needs are calculated each year through the FIREPRO funding analysis. All positions base-funded by FIREPRO will remain dedicated to wildland fire management, with at least 80% of their normal tour-of-duty spent on wildland fire activities. FIREPRO provides funding for fire planning and oversight functions, budgeted activities necessary to prepare for the normal fire year, and for the development and implementation of the wildland fire suppression, emergency rehabilitation, and hazard fuels reduction programs. FIREPRO-funded fire management program elements include (see chapter 18 of *RM-18* for element details):

- Preparedness
- Prescribed fire management
- Wildland fire management
- National resource crews
- Step-up plans
- Severity
- Emergency rehabilitation

5.3 Organizational Structure of Fire Management Program

Appendix 13.8 provides an organizational chart depicting the FOFR fire management program and its relationship to the park's overall organizational structure.

5.4 Interagency Coordination

FOFR coordinates fire management activities with the Glynn County Fire Department, the Georgia Forestry Commission, Okefenokee National Wildlife Refuge, the Georgia Department of Natural Resources, the Georgia Interagency Coordination Center, and local law enforcement (see chapter 5 of *RM-18* for authority and guidelines regarding interagency coordination).

5.5 Interagency Contacts

Georgia Department of Natural Resources, Coastal Resources Division, (912) 264-7218
Georgia Forestry Commission, Glynn County, (912) 262-2330
Georgia Interagency Coordination Center, (770) 297-3036
Glynn County Fire Department, (912) 267-5717, or 911
Glynn County Police Department, (912) 554-7800
Okefenokee National Wildlife Refuge, (912) 496-7836 or (912) 496-7366

5.6 Fire-Related Agreements

The park does not maintain an MOU with the Glynn County Fire Department (GCFD), as the GCFD's charter already includes responsibility for fire response to the park. A

statewide reciprocal fire protection memorandum of understanding exists between the U.S. Department of the Interior (National Park Service and U.S. Fish and Wildlife Service) and the Georgia Forestry Commission. Appendix 13.6 includes a copy of this MOU.

FOFR has no structural firefighting capability. All structural fire events at the park will be referred to the Glynn County Fire Department.

6.0 MONITORING

6.1 NPS Fire Monitoring Handbook

NPS policy requires managers to monitor the effects of all wildland and prescribed fires. Monitoring directives, summarized here from *Director's Order #18* are:

- Fire effects monitoring must be done to evaluate the degree to which objectives are accomplished.
- Long-term monitoring is required to document that overall programmatic objectives are being met and undesired effects are not occurring.
- Evaluation of fire effects data is the joint responsibility of fire management and natural resource management personnel.

FOFR will conduct its fire monitoring program in accordance with the *NPS Fire Monitoring Handbook 2001 (FMH 2001)*, which outlines standardized methods to be used for monitoring both wildland and prescribed fires. Monitoring protocols will be reviewed and approved at the Southeast Regional Office level before receiving funding.

6.2 Recommended Standard Monitoring Levels

FMH 2001 provides recommended standards, divided into four monitoring levels, which constitute the lowest level of fire monitoring to be conducted by NPS units. Table 7 illustrates how these monitoring levels correspond to the given park management strategy.

Table 7: Management Strategies and Recommended Standard (RS) Monitoring Levels

Management Strategy	RS Level
Suppression: All management actions are intended to extinguish or limit the growth of the fire.	**1. Environmental** **2. Fire observation** **- Reconnaissance** - Fire conditions
Prescribed fire: Management uses intentionally set fires as a management tool to meet specific objectives.	**1. Environmental** **2. Fire observation** **- Reconnaissance** **- Fire conditions** **3. Short-term change** **4. Long-term change**

*Bold face print in RS level column indicates mandatory monitoring for the given management strategy.

8.3 Wildland and Prescribed Fire Monitoring

As indicated, wildland fire suppression requires level 1 and the first stage of level 2 monitoring. Level 1 monitoring, coordinated by the park FMO, involves environmental or planning data that provide the basic background information needed for decision-making when a wildland fire occurs. The reconnaissance stage of level 2 monitoring, coordinated by the incident commander, provides a basic overview of a fire event. Monitoring the effect of suppressed wildland fire on vegetation or other area-specific variables can identify specific threats to park resources, facilitate adjustments to suppression actions, and identify the need for a rehabilitation response.

Prescribed fire requires all four monitoring levels to determine changes/trends in fuel loading and vegetative composition over time. These changes, sometimes subtle, can be critical indicators of whether the prescribed fire program is meeting specific objectives. Levels 3 and 4 monitoring objectives are tiered to resource and fire management objectives. FOFR fire and resource managers will collaborate to ensure that prescribed fire effectively meets overall objectives.

Level 3 (short-term change) monitoring provides information on vegetative change within a specific vegetation and fuel complex. These data allow for a quantitative evaluation of whether or not a stated objective was achieved. Data are collected primarily through sampling of permanent monitoring transects or plots. Level 4 (long-term change) monitoring typically involves a continuation of level 3 monitoring at the same permanent transects or plots, and serves to identify trends that can guide management decisions.

The park FMO will coordinate with the Southeast Regional Office Fire Ecologist to establish monitoring plots at select locations within the park. The Natchez Trace Fire Effects Team will conduct the levels 3 and 4 monitoring of these plots and complete associated documentation. The information gathered will be used as feedback to make any necessary refinements or changes to the prescribed fire objectives and prescriptions in place at the park. The monitoring program will continue to be refined as more intelligence is gathered through research regarding the role of fire in the various park vegetation communities.

7.0 FIRE RESEARCH

The park's Resource Management Plan indicates no specific fire research necessary to implement or refine the fire management program.

8.0 FIREFIGHTER AND PUBLIC SAFETY

8.1 Firefighter Safety and Related Training, Qualifications, and Fitness Standards

Firefighter and public safety is the first priority in every fire management activity. Agency administrators at all levels must stress that firefighter and public safety ***always***

takes precedence over property and resource loss. This policy will be emphasized throughout all fire management operations at the park.

The NPS wildland fire training, qualification, and certification system meets or exceeds all National Wildfire Coordinating Group (NWCG) standards. Only fully qualified (i.e. meeting NPS qualifications and accepted interagency knowledge, skills and abilities for the assigned fire job) employees will be assigned fire management duties (unless assigned as trainees, in which case they will be closely supervised by an individual fully qualified for the given position). All personnel (including emergency hire firefighters) engaged in fireline operations must have completed a minimum of 32 hours of basic wildland fire training, including the modules on basic firefighting, basic fire behavior, and standards for survival[5]. The park FMO will coordinate at least eight hours of mandatory annual safety refresher training for all FOFR staff likely to be on the fireline. (As previously discussed, there are presently no fireline-qualified staff at the park.)

Any fireline-qualified park fire management personnel will be equipped with approved personal protection equipment (PPE), and trained in its proper use. Operational personnel on wildland and prescribed fires (which will not be conducted at the park) are required to use the PPE. Mandatory PPE includes:

- 8" high, laced, leather boots with lug soles
- Fire shelter
- Hard hat with chin strap
- Goggles/safety glass
- Ear plugs
- Nomex shirt and trousers
- Leather gloves

The NPS *Wildland Fire Qualification System Guide* contains a supplemental list of PPE. Special PPE and hazard analysis is required for operations involving fuel gelling agents, fireline explosives, aircraft (particularly helicopters), and chainsaw operations.
Prior to and throughout all fire management field operations at the park, fireline supervisors will cover safety factors with incident personnel, via operational briefings beforehand, and safety briefings that occur during the incident. No NPS employee, contractor or cooperator will ever be intentionally exposed to life-threatening conditions (see *RM-18*, chapter 3, for further safety-related planning and operational guidelines).

NPS policy requires that all personnel (including emergency firefighters) engaged in suppression and prescribed fire duties meet the physical fitness standards set by the NWCG. Physical fitness/work capacity levels for wildland firefighters and other fire-qualified employees will be determined by the "pack test" series of tests. Descriptions of the three work capacity levels (light, moderate and arduous), as well as medical and

[5] An exception to this is the Glynn County Fire Department, whose members adhere to state-determined standards during the first operational period of a wildland fire (beyond that, they must adhere to NWCG standards).

physical fitness requirements and procedures are outlined in the NWCG *Wildland Fire Qualifications Subsystem Guide*.

8.2 Public Safety Issues/Concerns, and Mitigation Procedures

Under no circumstances will an individual be permitted near a wildland fire at FOFR without the appropriate training and required personal protective equipment (PPE). Members of the press will be allowed in the vicinity of a fire only if they are determined to meet the standards established for the light fitness rating, wear the required PPE, and are accompanied by a trained, qualified firefighter who can assist them.

In the case of a large wildland fire or prescribed fire operations, or during times of extraordinary fire danger, the FOFR superintendent or designee may, as a safety precaution, temporarily close all or part of the park to the visiting public. The chief ranger is responsible for enforcing the closure. Every effort will be made to inform the general public of the situation and evacuate the area, if necessary. If a fire threatens to escape park boundaries, adjacent authorities and landowners will be given as much advance warning as possible so that they may take appropriate action.

Every prescribed fire plan will outline safety measures. Actions will be taken as needed to ensure public safety, including contacting FOFR neighbors with as much advance notice as possible for them to properly prepare for the event, posting signs at the park alerting visitors of the planned event, ensuring that areas to be ignited are cleared of all visitors prior to ignition, closing portions of the park as appropriate, and posting "smoke on road" signs and controlling/escorting traffic as needed.

9.0 PUBLIC INFORMATION AND EDUCATION

The FOFR wildland fire prevention plan, included as Appendix 13.11, outlines public information/education activities related to the park fire management program.

10.0 PROTECTION OF SENSITIVE RESOURCES

10.1 Archeological/Cultural/Historic Resources

The park will incorporate archeological/cultural/historic resources protection into fire management in a variety of ways. For example:

- The park resources specialist will continue coordination with the Southeast Archeological Center to ensure that FOFR has the most current data regarding archeological resources within its boundaries. S/he will provide recommendations on how to mitigate adverse effects to these resources during fire management activities, and will coordinate compliance with Section 106 of the National Historic Preservation Act, as appropriate.

- Historic features, including foundations, structure remains, and above-ground burial vaults, will be protected from wildland fire via mowing of the grass around them.

- During all suppression activities, the minimum impact suppression tactics policy (see section 4.2.7) will be incorporated to the greatest extent feasible and appropriate for the given situation. Tactics directly or indirectly facilitating the protection of archeological/cultural/historic resources include:

    - Keeping fire engines or slip-on units on existing roads.
    - Not using heavy equipment (e.g. bulldozers, plows) for constructing fireline.
    - Not using fireline explosives.
    - Using existing natural fuel breaks and human-made barriers, wet line, or cold trailing the fire edge in lieu of fireline construction whenever possible.
    - Keeping fireline width as narrow as possible when it must be constructed.
    - Avoiding ground disturbance within known archeological/cultural/historic resource locations. When fireline construction is necessary in proximity to these resource locations it will involve as little ground disturbance as possible and be located as far outside of resource boundaries as possible.
    - Using soaker hose, sprinklers or foggers in mop-up; avoiding boring and hydraulic action.

The Southeast Archeological Center is preparing a document entitled *Fire Management Protocols for Archeological Resources in the Southeast Region*. This document will identify values and risks typically associated with different types of archeological sites found in the Southeast, and will provide guidance as to how different fire management activities can be tailored to minimize or mitigate any deleterious effects to the resources potentially at risk.

10.2 Natural Resources

The park will incorporate natural resources protection into fire management in a variety of ways, including minimum impact suppression tactics. The tactics listed in 10.1 as directly or indirectly facilitating the protection of archeological/cultural/historic resources also facilitate the protection of natural resources. Additional tactics include:

- Avoiding ground disturbance within known natural resource locations. When fireline construction is necessary in proximity to these resource locations it will involve as little ground disturbance as possible and be located as far outside of resource boundaries as possible.
- Using water in lieu of fire retardant.
- Minimizing cutting of trees.
- Protecting air and water quality by complying with the Clean Air Act, the Clean Water Act, and all other applicable federal, state, and local laws and requirements.

The park resources specialist will continue coordination with the U.S. Fish and Wildlife Service to ensure that FOFR has the most current data regarding identified sensitive,

proposed, and listed species, as well as any proposed or designated critical habitat areas within park boundaries. S/he will provide recommendations on how to mitigate adverse effects to these resources during fire management activities, and will coordinate compliance with Section 7 of the Endangered Species Act, as appropriate.

10.3 Development/Infrastructure

In addition to the ruins of the fort and remains of the town's residences, development at the park includes the visitor center/administrative complex with interpretive exhibits, offices, bookstore and auditorium; the maintenance compound with the maintenance shop, equipment and vehicle storage shed, and an artifacts (museum collection) storage building; two employee residences currently occupied by the park superintendent and chief ranger; a black powder magazine and loading shed (both currently under construction), a dinghy dock along the Frederica River; roads; and parking. The Bloody Marsh unit contains a gated entrance drive, a parking circle, a wayside exhibit, and a kiosk. Buildings will be protected from wildland fire via defensible space around each (ranging from 30 to 150 feet), which may consist of nonflammable material (asphalt, concrete), or a lack of fuel resulting from non-fire applications.

11.0 FIRE CRITIQUES AND ANNUAL PLAN REVIEW

11.1 Critiques

As per NPS policy, the park superintendent or designee will conduct a post-fire critique of every wildland and prescribed fire at FOFR, involving as many personnel who participated in the incident as possible. The critique will follow *RM-18* (chapter 13) guidelines, and will cover all aspects of the incident, including safety, tactics, difficulties encountered, areas needing improvement, and whether or not specified objectives were met. The information gathered from these critiques will be used to continually improve the effectiveness and efficiency of the fire management program. The critique will be attached to the associated DI-1202 fire report as a permanent record, and stored in park fire files.

As previously stated, firefighter and public safety is the first priority in every fire management activity. Any incident which results in human entrapment, serious injury, fatalities, or near-misses, will be investigated and reviewed, with appropriate administrative action taken based upon investigation results. Additionally, the park superintendent may request a regional-level review of any incident in which:

- The fire crosses park boundaries into another jurisdiction without the approval of the adjacent landowner or agency.
- The park receives adverse media attention.
- Significant property damage occurs.
- Controversy involving another agency occurs.

The Southeast Regional Office FMO will conduct an in-depth review of any wildland fires involving a type I or type II team.

11.2 Annual Plan Review

The park FMO will review the FMP annually and identify any changes that should be made to improve the effectiveness of the plan. The FOFR superintendent will approve significant changes to the body of the plan (excluding grammatical corrections, minor procedural changes, deletions, corrections, and additions to the appendices). The park FMO will promptly forward copies of all changes to the Southeast Regional Office FMO for review and comment. Changes requiring approval will be submitted with a new cover sheet for signatures and dates, which will replace the original cover sheet.

A formal plan review will be conducted every five years, and the plan revised to incorporate any policy changes that have occurred in that five-year period.

12.0 CONSULTATION AND COORDINATION

The following individuals provided information, assistance, and guidance in the preparation of this plan:

Kim Coons, Fire Management Officer, Fort Frederica National Monument
Clint Cross, Wildland Urban Interface Coordinator, Southeast Regional Office
Dean Gettinger, Fire GIS Specialist, Southeast Regional Office
Caroline Noble, Fire Ecologist, Southeast Regional Office
Terry Palmer, Chief Ranger, Georgia Forestry Commission, Glynn County, District 12
Kevin Scasny, Fire Weather Meteorologist, Southern Area Coordination Center
Kevin Walsh, Prescribed Fire Specialist, Southeast Regional Office
Fred Wetzel, Fire Management Officer, Okefenokee National Wildlife Refuge